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P. D. 34.

NINETEENTH ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS

REPORT OF THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1933, the Department of Public Health was constituted as follows:

Commissioner of Public Health . . . . Henry D. Chadwick, M.D.

Public Health Council

Gordon Hutchins, 1934	Sylvester E. Ryan, M.D., 1934
Francis H. Lally, M.D., 1936	Richard P. Strong, M.D., 1935
Roger I. Lee, M.D., 1936	James L. Tighe, B.A.Sc., C.E., 1935

Regular monthly meetings of the Department have been held throughout the r.

The Committee on Sanitary Engineering, composed of Mr. Tighe, Chairman, Mr. utchins and the Commissioner, has met each month prior to the regular meeting the Council and submitted its recommendations on all matters of sanitary sig- nificance.

Three investigations have been made by direction of the Legislature: Chapter 10, esolves 1933, Use of Great Ponds for Recreational Purposes, jointly with the Department of Conservation and the Metropolitan District Commission; Chapter 15, Resolves 1933, Improving Spot Pond Brook, jointly with the Metropolitan District Commission; and Chapter 43, Resolves 1933, Diseases in Granite and Foundry Industries, jointly with the Commissioner of Labor and Industries, the Commissioner of Insurance, the Attorney General and the Chairman of the Industrial Accident Board. Reports of the investigations in each instance are ready for submission to the Legislature and they are referred to in other parts of this report.

Several hearings have been held, chiefly relating to the refusal of the towns to rant milk licenses to large milk companies wishing to deliver milk in these com- unities.

At a meeting of the Department on January 16, 1934, the Commissioner of Public ealth presented to the Council a report of the doings of the Department for the r 1933, and after discussion it was voted that this report, together with the egoing brief summary of the activities of the Public Health Council, be approved d adopted as the report of the Department of Public Health for the year 1933.

1938

NINETEENTH ANNUAL REPORT OF THE COMMISSIONER OF PUBLIC HEALTH

To the Public Health Council:

Gentlemen: I have the honor to submit herewith my annual report for the fiscal year ending November 30, 1933, although, as in the past, all figures except those relating to the budget will be given for the calendar year.

Having held the position of Commissioner for but two months, it is with a much restricted vision and little experience that I have prepared the report of this year's work.

It is rare indeed, and fortunately so, that three men with such distinguished records of service have left the Department in any one year. I refer to former Commissioner, Dr. George H. Bigelow, Mr. Harry W. Clark, and Dr. Benjamin White.

Dr. Bigelow became Commissioner in 1925. During his eight years of service in this capacity he has maintained a most efficient organization and made many noteworthy advances in the field of public health. The work of all Divisions has been broadened, one new Division, that of Adult Hygiene, has been added, this being a new field for any state department to undertake. The establishment of a hospital for the study and treatment of cancer and State clinics for the diagnosis of cancer are the outstanding accomplishments of his administration. A comprehensive survey was made to find the incidence of chronic disease. As the basis for this data, 75,000 people were interviewed in their homes. A persistent campaign was carried on to improve milk supplies and extend the use of pasteurized milk, and further efforts were made to eradicate bovine tuberculosis. As a result, 85 per cent of the people of the State are using pasteurized milk, and milk-borne outbreaks of disease are few in number and limited in extent. The establishment of two health districts in the Nashoba area and the Southern Berkshires in cooperation with the Commonwealth Fund are examples of health work in rural areas that will establish a precedent that is bound to be followed by other groups of towns. The pneumonia study that has been going on for three years is another achievement that is promising in results. It is unfortunate that so successful and brilliant an administrator has withdrawn from the field of public health.

Mr. Harry W. Clark, Director and Chief Chemist of the Division of Water and Sewage Laboratories, retired from active service with the Department after devoting about forty-five years largely in research concerning the principles of sanitary engineering. Mr. Clark has been a pioneer in scientific discovery of methods of water, sewage and industrial waste treatment and purification and his contributions in this connection and other matters pertaining to environmental control are known throughout the world. It was with the deepest regret that the Department had to lose his services. Following Mr. Clark's retirement, the Division of Water and Sewage Laboratories was placed under the direction of the Division of Sanitary Engineering.

Dr. Benjamin White because of ill health resigned from his position as Director of the Division of Biologic Laboratories, a position which he had held for about thirteen years. During that time Dr. White had done a great deal in building up the laboratory and expanding its usefulness and service to physicians in the Commonwealth. The vacant position was filled by the promotion of the Assistant Director, Dr. Elliott S. Robinson, who became Director on October 18th.

I. GENERAL MATTERS

Notwithstanding the continued serious economic condition the general good health of the people has been maintained. No serious epidemics have occurred. There has been a decrease in the number of cases of communicable disease, chiefly due to fewer cases of diphtheria, measles, scarlet fever and tuberculosis. Typhoid fever reached an all-time low with but 162 cases and 22 deaths. Ten years a there were 622 cases and 70 deaths; twenty years ago 2,398 cases and 280 deatl in 1910 there were 3,452 cases and 411 deaths. Sanitary engineers and pub health officials are to be given much credit for having brought this disease und control. Another triumph has been the elimination of smallpox. Not a single ca was reported in the State this year. Universal vaccination, however, is necessa to keep it out while the disease persists in any area with which we have communication. For this reason a bill requiring compulsory vaccination of children in private schools is sponsored by the Department this year. The low incidence of anterior poliomyelitis last year continued until the beginning of the summer. The disease then appeared in the eastern part of the State. Altogether, 353 cases, with 32 deaths, were reported. This was the only one of the serious communicable diseases that showed an increase both in cases and deaths.

The wisdom of uniting groups of small towns into districts for carrying out modern health procedures has been effectively demonstrated in the Nashoba and Southern Berkshires areas. The Commonwealth Fund, with the cooperation of the Department, has been actively engaged in the organization and maintenance of these units as a demonstration of what can be done to make available to the people of the rural communities the benefit of the knowledge we have in regard to sanitation, disease control, and prevention. The people of these two units are showing keen interest in this work and it is hoped that next year the towns will vote to assume a part of the cost of maintenance and in the course of the next three years when the Commonwealth Fund is planning to withdraw its support be willing and able to carry it on.

The pneumonia study and service, and the cancer and tuberculosis studies have all been aided by grants from the Commonwealth Fund and the Rockefeller Foundation. Such investigations, important as they are, could not have been carried on by the Department without their aid. The third year of the proposed five-year study of lobar pneumonia has been completed. The Division of Biologic Laboratories has succeeded in producing a concentrated antipneumococcic serum with increased potency. Research is being carried on to improve its quality and eliminate the chill reaction producing substance from the serum. During the past three years the distribution of this product has increased by at least 100 per cent as compared with the amount distributed prior to the study. The potency has been increased an average of 50 to 75 per cent. With the cooperation of the Division of Adult Hygiene a statistical study has been carried on and analysis made of the data obtained from the death certificates of some 60,000 persons dying of all forms of respiratory disease in this State. A somewhat similar analysis was made of the data obtained from 8,800 hospital records of patients ill with lobar or broncho pneumonia. In cooperation with the Harvard School of Public Health under Dr. Smillie's supervision epidemiological studies on lobar pneumonia have been carried out during the past two years. This work has confirmed previous findings that a very large percentage of all normal persons become carriers of pneumococci of some type each year. It has been found that with the exception of perhaps one or two of the higher types of pneumococci, the only types that appear of definite epidemiological significance are Types I and II. Studies of persons in contact with cases of lobar pneumonia due to these latter two types have shown that approximately one-fourth of the contacts of such cases in the home become carriers of the type to which they were exposed. Studies carried out on the attendants of similar cases in hospitals have not revealed this high percentage of carrier state. These findings suggest that the semi-isolation of Type I and II cases cared for at home might be advisable whereas it is probably not necessary to maintain this isolation of patients treated in the hospital.

In order that patients ill with lobar pneumonia may receive the benefits of serum treatment, if such is desired by the physician in charge, an organization to facilitate such serum therapy has been formed in 16 areas over the State, embracing well over half the population of the Commonwealth. Technicians from one or more of the centrally located hospitals in each organized area have been trained in pneumococcus typing in order that the etiological diagnosis of patients ill with lobar pneumonia in these areas might be uniformly carried out. Ten other areas not already organized have requested a similiar type of service.

In an attempt to reduce the expected mortality from lobar pneumonia among the 5000 men located in Civilian Conservation Corps Camps in this State, arrangements have been made to supply the physicians in these camps with antipneumococcic serum for the treatment of such cases. In such instances pneumococcus typing will be carried out at the nearest approved laboratory.

Under Chapter 43 of the Resolves of 1933, the Commissioner of Public Health was made a member of the Industrial Disease Commission to study the incidence of disease in the granite and foundry industries. A very comprehensive investigation of the conditions under which employees work in these industries and the effect of the inhalation of silica dust on the health of the individual workmen was made. This involved the study of the kinds and size of the dust particles, their concentration in the air being inhaled by different classes of employees, and the evidence of disease that could be attributed to the conditions to which the workmen were exposed in the course of their employment. To determine the incidence of respiratory disease, X-rays were taken of 1,609 foundrymen and 961 granite workers. The report, which is nearly ready for submission to the Legislature, is the most comprehensive of any similar study undertaken in the United States. The necessity for the installation of dust removing devices wherever possible for the protection of the men is recognized. X-ray examination of the men at intervals is essential to detect tuberculosis as it is that disease that disables and causes the high mortality among the men employed in these industries. With tuberculosis eliminated and the amount of dust reduced to a minimum, the health hazard in these industries would be greatly reduced.

II. Communicable Disease

There has been a decline in the total number of cases of communicable disease reported, from 94,379 in 1932 to 83,288 this year. The reduction has been chiefly in measles, mumps, scarlet fever, and tuberculosis. Diphtheria, typhoid fever, and epidemic cerebrospinal meningitis show a gratifying decrease. Whooping cough was considerably more prevalent and anterior poliomyelitis showed a slight increase. No case of smallpox was reported, for the first time in the history of the state.

Outbreaks.—Two outbreaks of milk-borne disease occurred on the routes of two dealers who sold raw milk. One Hingham dairy, selling unpasteurized milk in Hingham, Weymouth and Quincy, was responsible for 43 cases and 2 deaths. Some of these cases were characteristic of septic sore throat, others of scarlet fever, and there were two cases of erysipelas—all conditions known to be associated with hemolytic streptococci. That organism was found in the udder of one of the cows supplying the milk.

The other outbreak occurred in East and West Bridgewater and resulted in 57 cases of scarlet fever and 38 cases of sore throat. One of them was fatal. The attack rate was extremely high as 95, or 64.2 per cent of the 148 milk users became ill, indicating a very heavy infection. Hemolytic streptococci were found in the udder of one cow. The evidence is so conclusive in these cases that we can state without qualification that the sale of raw milk caused the serious illness of 95 persons and 1 death. This loss in death, suffering and expense could have been saved by the simple procedure of pasteurizing the milk.

Anterior Poliomyelitis (Infantile Paralysis).—The first six months of the year showed a lower incidence of this disease than has ever been the case at this season of the year. The low record of the previous year was continued until June when cases developed in Boston. Others appeared in the city and in other communities of the Metropolitan Area with the result that July showed a higher incidence of the disease (78 cases) than any corresponding month since 1916. In August there were 148 cases, the disease appearing in other cities adjoining Greater Boston and in the central part of the State. In September the number of cases dropped to 83. For the year there were 353 cases with 32 deaths. In 1932 the number of cases was 61, with 13 deaths, an extremely low incidence, but the case fatality rate was much higher than it was this year. The plan put into effect last year for collecting blood and distributing convalescent serum has been continued. Consultants are available when requested but the private physician may also obtain and administer the serum in preparalytic cases if he so desires without calling a consultant. In distributing the serum the Department only guarantees its sterility. There is as yet no conclusive evidence of its efficiency but until it has been demonstrated to be without value it seems desirable to supply it though still on trial.

Diphtheria.—The number of cases, 1,041, decreased 42 per cent over the previous year. There has been a steady drop since 1927, when 4,750 cases were reported.

The fatality rate of 8, however, is higher than it has been since 1918. One can only conjecture as to the cause of this. It may be due to greater delay in calling a physician because of the poor economic situation. This is indicated by the higher fatality rate in those cities where unemployment and poverty are most marked. Immunization against diphtheria has been done to a greater extent than ever before and the Department has been very active in urging cities and towns to start this service as a routine part of the health work. The number of communities that persist in failing to meet their obligations in this regard has been reduced from 50 last year to 32. Marblehead has done nothing officially to provide immunization and Haverhill and Clinton very little. In these larger communities there are many susceptible children and some of them may have to pay with their lives for the neglect by the city fathers to furnish protection against diphtheria. However, progress is being made in a State-wide way and eventually the recalcitrant and procrastinating guardians of public health will accept their responsibility and provide ways and means for immunization until such time as the private physicians are ready to take it over as a part of their obligation to the families in which they practice.

Typhoid Fever.—Most gratifying is the record for typhoid fever. Only 162 cases have been reported, with 22 deaths. In 1910, with a million less population, there were 3,452 cases and 411 deaths. This is indeed a triumph for the science of sanitation in providing purer water supplies and more adequate sewage disposal plants. There have been but five small outbreaks of typhoid fever, none of them of considerable size, the largest group being 5 cases.

There also has been a decrease in the amount of endemic typhoid due to carriers. With the lessened incidence of the disease, the carrier problem inevitably becomes less as the years go on and we can look forward to a period when typhoid fever has ceased to exist. With the increasing prospect of eventual control, the carrier problem is becoming of more and more interest and therefore local health officers are becoming more active in their efforts. Two carriers were found in Springfield, one in Worcester, and one in Fall River, and one by the Massachusetts General Hospital. Altogether, 19 carriers have been added to the list, 14 through investigation of cases, 3 through routine examination of specimens submitted during convalescence, and two moved into the State. Six carriers submitted to gall bladder removal for the cure of their condition.

Of the 162 cases reported, the source was found in 32 instances. Of these, 24 were due to carriers, (18 to contact with a previously unrecognized carrier, and 6 to contact with previously listed carriers), and 8 were due to contact with another case of typhoid.

Scarlet Fever.—This is the third year with a very high incidence of this disease. In 1932 it reached an all-time peak of 16,580 cases with 145 deaths. This year the number of cases has been approximately the same as in 1931, about 12,000. No isolation or quarantine measures seem to have any appreciable effect in controlling the spread of scarlet fever because there are so many mild cases unreported or unrecognized that serve as foci of infection. The most promising method of dealing with the disease seems to be the immunization of children with scarlet fever toxoid and administering convalescent serum to susceptible children who have been exposed. The Department has been cooperating with the U. S. Public Health Service in studying this problem. Scarlet fever toxoid has been used in Massachusetts for over two years with highly satisfactory results. For over a year it has been made a routine procedure in the State Sanatoria for tuberculosis, resulting in the complete disappearance of scarlet fever from these institutions, for the first time in many years. At the Wrentham State School for the feeble-minded it has been very effective in preventing scarlet fever over a period of two years.

During the past month the Department at the invitation of the Board of Health of Wellesley has offered its facilities for the immunization of school children in that town. The Dick test was first given to about 800 children and 85 per cent of them were found susceptible. Our supply of toxoid is limited at the present time but we will be able to use it in a few more communities.The institutions will also be offered this service as a demonstration of its effectiveness. If the toxoid is as effective as it now appears to be, the troublesome problem of scarlet fever can be solved and the disease kept in subjection. Scarlet fever can then be listed with the other controllable diseases, typhoid fever, diphtheria, and smallpox.

The use of scarlet fever convalescent serum has been proven of benefit to reduce transient infection of exposed children. Experience with this serum has demonstrated its usefulness in preventing secondary cases in family contacts. That has been tried in Newton and Hingham with marked success and recently Brockton has decided to make use of this method of protection. The Department cannot supply the serum for this but will do the processing for any community that will supply the blood.

Amebiasis.—One of the by-products of the Century of Progress Exposition was the propagation and dissemination of the Endamoeba histolytica. Many persons who visited Chicago last summer between May and October developed amebiasis after they returned home. Thus far 18 cases have been reported in Massachusetts, two resulting fatally. Nearly all of them were members of the American Legion who attended the Convention in Chicago. Infection was traced to two or three hotels. No secondary cases have developed from the cases in this State. This experience at Chicago emphasizes the need of strict supervision of sanitation in hotels and restaurants.

Measles.—Thus far measles has been one of the uncontrollable diseases. From 12,000 to 40,000 cases are recorded each year. Although the death rate is low, it remains one of the serious illnesses of infants and young children. This year, with 15,067 cases, there were but 27 deaths, an unparalleled low mortality. This is evidence of a new deal in measles virulence. Let us hope that it will continue until such time as a method of producing immunization can be developed and applied. There is hope of this in the placental extract being developed by McKhann at the Children's Hospital. It is anticipated that money can be obtained from some foundation that will enable this study and experimental work to go on and with the cooperation of the Harvard Medical School and the Department that sufficient material may be available to use on a sufficiently large group of susceptible children to demonstrate its value. The work already done is most promising.

Pneumonia.—The total number of cases is about 250 more than the previous year, with a slightly higher death rate. There has been an increased incidence of broncho pneumonia. When respiratory diseases are prevalent there is usually an increase in mortality from whooping cough, measles, and pulmonary tuberculosis.

Rabies.—This disease was at a lower level in animals at the beginning of the year than at any time during the past five years. About March the disease began to appear in increasing numbers in Boston and Newton. From these cities the disease spread into contiguous areas and also the northeastern and southeastern sections of the State. As the year ends the prevalence is up to about the average for the five year period. Efforts are being made to control rabies through immunization. Clinics for this purpose have been conducted in Framingham, Newton, Natick and Watertown. The Department has assisted the Massachusetts Veterinary Association in the free distribution of popular leaflets dealing with the control of rabies and emphasizing the value of vaccinating dogs.

One human death from rabies occurred. This was a child two years of age who was severely bitten about the face. The failure to cauterize the wounds and delay in instituting specific treatment until after the laboratory report was obtained contributed to the fatal result.

Septic Sore Throat.—Two hundred and six cases were reported as compared with 232 last year. Most of these occurred as a result of two milk-borne streptococcal outbreaks traced to cows with chronic mastitis. In the same outbreaks there were associated cases of scarlet fever and erysipelas.

Tuberculosis.—The number of reported cases was 3,541 which is 453 less than a year ago. Whether this indicates a lessened incidence of the disease or failure to report cases is difficult to evaluate. There is this to be said, however, as indicating a decrease in the morbidity from this disease: Though reporting has always been poorly done it is about the same ratio of cases per death as in previous years. The ratio of 1.7 cases per death is very low. It would be at least 4 to 1 if physicians would report the cases they now have under their care. The deaths from pulmonary tuberculosis were 2,059, 18 more than last year. Doubtless the higher incidence of pneumonia during the year hastened the deaths of some cases of tuberculosis. The death rate from this disease is always affected adversely when acute respiratory diseases are unusually prevalent.

Treatment of Pulmonary Tuberculosis. This has improved very much in the last few years; in fact, one could say that it has been revolutionized by realization of the advantages of collapse therapy. Instead of reserving this method of treatment for the case that fails to respond to the routine bed treatment, it is now considered good practice to use pneumothorax or phrenic nerve operation soon after admission. By doing this the patient has the benefit of local rest applied directly to the diseased lung to supplement the bed treatment that has been carried out to a greater extent than ever before. More cases are arrested and the period of hospitalization is shortened by the use of pneumothorax and surgical procedures. There is an encouraging increase in the use of these methods in State and county sanatoria. At Rutland a recent survey showed 62 per cent of the patients receiving some form of collapse therapy. In the county sanatoria 20 per cent, or 1,088, were having pneumothorax. In addition, 11 per cent of phrenic nerve operations and 4.6 per cent of thoracoplasties were done. This is encouraging but as the benefits from this form of treatment are more generally realized all patients on admission may be studied as to the indications for some form of collapse. At least 75 per cent of them will be found suitable for pneumothorax or other form of collapse therapy. The treatment of tuberculosis if carried out in the active way that should be done to give the patient the best hope of recovery requires a larger resident staff of physicians. One doctor cannot give proper attention to more than fifty or sixty patients. Not only that, but a consulting staff representing different specialties should be provided to give attention to the many complications and associated conditions that arise in the course of the patient's institutional life. By remedying these conditions the patient has a better chance for recovery, is more comfortable, and the period of hospitalization is shortened.

Diagnosis.—It is somewhat discouraging to know that only about 10 per cent of the admissions to sanatoria are in the minimal stage. If we investigate the records of large city clinics we find that in those that have the best facilities for diagnosis, and X-ray all children who react positively to tuberculin, and make Roentgen examinations of all adults, the percentage of minimal cases is found to be about 20 per cent. In clinics that do not use the X-ray except where examination of the chest shows suspicious signs, less than 10 per cent of early cases are found. Less dependence should be put on the use of the stethoscope and more extensive use should be made of the X-ray. The X-ray, because of its cost, is looked upon by most physicians in the light of a consultation. Instead it should be considered a necessary routine procedure where the question as to whether a person has tuberculosis is to be answered. To do this X-ray films and service must be provided without charge to many individuals. Realizing this fact, consultation service including X-ray is provided to all physicians by the State Sanatoria and many of the county institutions. This privilege should not be abused by sending patients who can pay a roentgenologist's fee, but all others should have this service. Each State and county sanatorium should be the center for the diagnostic service in its immediate territory. Besides examining patients who come to the institution clinics should be maintained in the more distant localities in connection with hospitals where X-ray equipment is available. The old-time dispensary maintained for diagnosis and for check-up of tuberculosis patients has served a useful purpose in the past, but its methods are now obsolete and it should not be continued. The diagnosis and follow-up of tuberculosis patients should be a function of a sanatorium and the State should be divided into districts so that all areas can be served by the staff of some State or county sanatorium. Nursing service only need be continued by the local communities.

The Ten Year Program, now in the tenth and last year.—At its termination a plan has been made to continue its more essential features. In brief it is this: As tuberculosis is more prevalent during adolescence it is proposed to examine only the seventh, ninth, and eleventh grades, thus making three examinations during that period, the school physicians to do the tuberculin test as part of their annual examination, the X-ray service for the positive reactors to be provided by the State or county sanatorium. The children that show X-ray evidence of disease will then have a chest examination and the report of conditions found given to the family physician. A special effort will be made to examine all contact children and also to find the source of the infection in children found to have tuberculosis. It is expected that the nearest State or county sanatorium will undertake this work as one of its responsibilities, thus combining the school and community into one unified program of tuberculosis case-finding and control. The Department will assume as its responsibility the supervision of a group of about 10,000 tuberculous children who have been found during previous clinics. A follow-up unit will continue to carry on this work as long as these children remain in school. The doctors, nurses and X-ray technicians attached to this unit will be available to aid in any way that they can during the transition period from State to local control.

During the school year 1932-33 there were 58,032 children in seventy communities tested. Consents for the test were given in 65 per cent of the total enrollment in the lower grades and 60 per cent of the high school pupils. The percentage of positive reactors was 25 per cent for the children in the lower grades and 44 per cent for the high school students. A study of the incidence of infection in the contact and non-contact groups was made by Dr. Pope. It was found that 66 per cent of the contacts in the grades and 85 per cent in the high school were infected. The proportion of pulmonary and suspected pulmonary cases among the contact children in the grades was 10 times and among the high school pupils 30 times as high as in the non-contact group. As case-finding efforts are improved and as institutional treatment becomes more effective, more beds are needed to meet the demands from patients. In some sections of the State, notably in Middlesex and Hampden Counties, more sanatorium beds are needed. It is to be hoped that the time is not far distant when the small municipal tuberculosis hospitals will be abandoned and the patients sent to larger institutions where modern and effective treatment can be carried out. The boarding house type of institution should be relegated to the past. It is true that it serves the purpose of isolation but it cannot give the patient the treatment to which he is entitled. There is some prospect of Lowell and Cambridge joining the Middlesex County Hospital District and the two local hospitals being taken over by the Middlesex County Sanatorium and used for chronic cases. This outcome is much to be desired. If Hampden County would build a sanatorium or unite with Hampshire, Berkshire and Franklin and build a modern type of institution, the construction program for the care of tuberculosis in the State would be quite complete.

Undulant Fever.—It is stated that about 40 per cent of the cattle in Massachusetts are infected with the organism that causes undulant fever in man. Only 11 cases, however, were reported, and 15 the previous year. It is evident, therefore, that the disease is not one to be feared in this State. Furthermore, 85 per cent of the people of Massachusetts are protected from this disease, as well as others, by using pasteurized milk.

Gonorrhea and Syphilis.—Six thousand five hundred and ninety-one cases of gonorrhea and 4,466 of syphilis were reported. This represents a slight decrease in both diseases over the previous year. This decline has been progressive since 1931 for gonorrhea and is the first evidence of any decline for syphilis since 1930. There is reason, however, for believing that some of the decline may be due to the failure of physicians to report cases. A fact of significance, indicating a lessened incidence or a less severe form of syphilis or more benefit derived from treatment, is the decrease in deaths. Fifteen years ago 280 deaths were reported, or a rate of 7.4. Last year the number of deaths was 162 and the rate 3.8. Lapsed cases were more numerous. This may indicate less attention to treatment or better reporting of cases, especially from the clinics. There was an increase in the number of cases of both gonorrhea and syphilis reported from clinics but the increase does not in any degree balance the decline in reports received from physicians. It does not appear, therefore, that the increase in new clinic cases represents practice of which physicians have been deprived. Further, all kinds of clinics are more and more using routine blood tests for the discovery of syphilis, which is not at all common in private practice. Consequently, much of the gain in new syphilis cases in clinics is the result of clinic initiative in the discovery of infections rather than at the expense of private practice. The total visits to clinics showed an increase of 8.5 per cent as compared with an increase of only 5.5 per cent in new patients. Apparently each new year has disclosed an increasing tendency on the part of patients to remain under treatment longer and to visit the clinic more regularly because the increase in visits has constantly exceeded the gain in new cases. It may be concluded from this, also, that the increase in lapsed cases reported is the result of better reporting of lapses rather than any increase in the tendency of patients to neglect treatment.

The Lynn Department of Health has recently reorganized its clinic on the lines laid down by the Department of Public Health and the subsidy which had been withdrawn has now been restored.

The minimum standards for the conduct of gonorrhea and syphilis clinics, which were prepared last year and approved by all of the interested groups, were adopted by the Public Health Council on February 14, 1933. These standards should be of considerable service in improving conditions at some of the more backward clinics.

The distribution of arsenicals for 1933 will establish a record as approximately 50,000 grams will be used this year. The highest previous distribution was 49,900 grams in 1931. Approximately 14 per cent of the distribution of arsenicals is to physicians, the remainder being to clinics and institutions. One hundred and twenty new physicians have been added to the list of those to whom arsenicals have been distributed, bringing the total number who have received these drugs since the first of 1929 to 896.

There have been distributed about 38,000 pieces of literature. Forty-five lectures have been given by the Assistant Director during the year to medical societies, nurses, medical schools and colleges, social workers, and other groups of a miscellaneous nature. Three broadcasts on gonorrhea and syphilis have been given, bringing the total since the beginning of this feature to seven. It is remarkable that to date not a single adverse comment has been received from any listener. Dr. DeWolfe has continued to visit physicians from office to office, although during the first five months of the year he substituted for district health officers and consequently his activities for the Subdivision of Venereal Diseases have been somewhat curtailed.

The Neisserian Medical Society, which was organized three years ago, is still remarkably interested in the control of gonorrhea. Its activities have attracted some outside attention and there is a move on foot to organize a National Neisserian Medical Society with the same objectives as the local organization.

Division of Biologic Laboratories.—The distribution of the different biologic products varies with the incidence of disease. Less diphtheria antitoxin was given out because of the reduction in cases of diphtheria. The greater general recognition of the value of immunization against this disease is shown by the increased demand for diphtheria toxin-antitoxin. This demand continues to be large. October was the record month for the distribution of this product. There was an increasing amount of diphtheria toxoid used and the indications are that this will eventually take the place of toxin-antitoxin for immunizing all young children. The production of alum diphtheria toxoid is being carried out in an experimental way. If reports as to its efficacy in producing immunization with but one dose are confirmed by further investigation, it will be a decided advantage and make easier the attainment of the ultimate goal of routine immunization for all children.

III. Non-Communicable Disease

Nutrition.—The Department has been called on by many communities to assist to a greater extent than ever before in planning food budgets for recipients of welfare relief to the end that an adequate dietary will be supplied at minimum cost. Conferences were held with the State Departments of Education, Public Welfare, Agriculture, Labor and Industries, and the Extension Service to advise in the emergency nutrition program. Home economic classes were arranged to teach mothers how to plan and serve the food that the low budgets provided. In cities where commissaries were operated, nutritionists assisted in making the plans, with resulting savings in cost, thus providing a more adequate amount of food for the recipients of relief. The summer camps for children were visited to observe the food planning and service, and a summary of the findings with suggestions for improved methods was prepared and sent to the camp managers in the fall. A course in Normal Nutrition was given at the Hyannis State Teachers' College to meet the need of nurses, the school child, and people in the community. The results were so satisfactory that a more extensive course will be given to the nurses of the State next year. Several meetings were held with the chain store dealers and wholesale grocers early in the year. Following these a flood of requests for printed matter on nutrition was received. From the wholesale dealers came 1,700 requests for this material. Many talks were given by the Nutrition Consultant and the other nutritionists, mainly on welfare food allowances, budgeting, and food planning for adequate nutrition. Consultant service was given to Ayer and Nantucket in a dental-nutrition study in these communities. Conferences were also held with students from Simmons College and the Framingham State Teachers' College. Special interest centered in the Cape Cod district in the towns needing help in the preparation of suitable school lunches.

Dental-nutrition studies were made at the State Sanatoria for tuberculosis. At the Lakeville and Westfield Sanatoria tomato juice was given daily to groups of children and the dentists in attendance reported a marked change in arresting and preventing tooth decay. The Department nutritionists supervised the nutrition teaching in preschool dental clinics in Springfield and a group of children in the first six grades in Ayer and Nantucket. It was found that many of the children needed more milk, fruits and vegetables.

Dental Hygiene.—It has been felt for some time that the dental hygiene work of the Department should have the added force of consultant service from the dental profession. Consequently, Dr. Leroy M. S. Miner, Dean of the Harvard Dental School, and a member of the Dental Advisory Committee to the Department, was appointed as Consultant in Dentistry, and the dental-nutrition studies mentioned above were carried on in cooperation with him. The aim of the study was to find dental-nutrition cases. On the findings of the dental hygienist and nutritionist were based recommendations for supplementary foods to be supplied by the community, as well as dental clinic service. This is an entirely new approach to the problem of dental caries and points the way to more school inspections and proves that dental health and good nutrition, while acknowledged as inseparable in theory, can also be made so in community planning.

The high peak in curtailment of dental clinics due to the depression was reached early in the year, affecting about twelve communities. To meet this emergency, in some instances a volunteer clinic was established or financial aid obtained from local clubs. A State-wide dental survey is being made according to a plan sponsored by the American Dental Association and the U. S. Public Health Service. This will result in a survey of the mouths of one-tenth of the elementary school population in Massachusetts. Such a survey will stimulate the community to a realization of the dangers of dental disease and it is to be hoped will result in the further extension of dental care among the school population.

At the request of the Department the annual district addresses of the President of the State Dental Society included a discussion of the advantages of using dental certificates for child patients in the dentists' offices.

The self-supporting traveling dental clinics have been of great value in providing service to communities where there is no resident dentist. We have succeeded this year in spreading this service more generally.

Health Education.—The Health Education Worker of the Division of Child Hygiene provided advance publicity for all the Well Child Conferences conducted by the Department. Lectures on publicity were given before students in seven hospital training schools. Two demonstration teaching courses of twelve lessons each were given to sections of freshman and sophomore high school classes and talks were given on various aspects of health education to communities throughout the State.

Three new exhibits were planned on diphtheria, teeth, and a dental exhibit for special exhibition at the American Dental Association. The Department exhibits were displayed at the meeting of the State Federation of Women's Clubs, the Massachusetts Medical Society, Child Health Day exhibitions, Visiting Nursing Associations, Boy Scout Councils, 4-H Clubs, and other meetings in various parts of the State.

Four special numbers of the quarterly bulletin of the Department, "The Commonhealth", were issued during the year, devoted to the following subjects: The Child, Cancer, Control of Gonorrhea and Syphilis, and Epidemiology. There were distributed during the year over 20,000 copies of this bulletin.

The demand for pamphlets has increased, particularly those having to do with nutrition, budgeting, etc. Much work has been done by our Health Education Worker (Artist) this year in contacting supervisors of drawing in local communities, distributing our printed matter and poster suggestions. This project centered largely in the parochial schools throughout the State where little work has been done heretofore and where the material was very well received. Only a small portion of the State now remains to be covered with this particular material.

At the close of the year there were on the register for the monthly letter service to prospective mothers and to mothers of children under two years of age approximately 18,000 persons. The new requests for prenatal letters totaled over 6,000 and the requests for first year postnatal letters numbered about 6,200 during the year. Fathers' letters were sent to all families requesting the prenatal letters, to the number of over 6,000.

Three Consultants in Public Health Nursing completed a sixty-hour course in Teacher Training conducted by the State Department of Education.

Public Health Nursing.—Miss Ada Boone Coffey came in October to become the Chief Consultant in Public Health Nursing. Under her leadership much is expected in developing further the generalized plan for the consultant nurses of the Department and by offering courses to nurses in local communities many of whom have not had an opportunity for special training in public health to raise the standard of their work. Courses have been given in public health to student nurses in many of the hospital training schools. A total of 448 nurses in training have had this instruction. A special plan was worked out under Dr. Sumner H. Remick for home visiting and instructions to patients awaiting admission to the sanatorium.

The Advisory Committee on Public Health Nursing has rendered valuable assistance on several occasions during the year.

A distinct advance in the field of maternity care was the preparation and printing of a pamphlet outlining Community and Nursing Standards for Maternity Care. This was accomplished by the Obstetrical Section of the State Medical Society through the Advisory Committee on Obstetrics appointed in 1932 to confer with the Department on such matters.

Division of Adult Hygiene.—During the past year, the Division of Adult Hygiene devoted approximately 85 per cent of its time to the cancer program, 10 per cent to appendicitis, and the remainder to other chronic diseases. During the year, the educational activities have been continued. Altogether there were 151 broadcasts. Thirty-seven of these comprised the series jointly sponsored by the Massachusetts Medical Society and this Department, broadcasted by members of the Medical Society. Fifty-one broadcasts were given by the Division Directors or members of their staffs. This series gave information about the various activities of the Department. Fifty broadcasts of the Radio Health Forum were given, each one consisting of some phase of public health, questions from the public, and the answers to them. For three months a series of health plays was presented through the courtesy of the WBZ Players. The newspaper Health Forum is mailed weekly to 65 newspapers throughout the State. About 9,000 pieces of literature have been distributed.

The week of June 12 was set aside as "Appendicitis Week." The Boston Health League, druggists' associations and insurance companies cooperated, 1,500 posters were displayed, and 25,000 flyers were distributed. Broadcasts and lectures were given by members of the Division informing the public of the campaign.

Cancer.—The educational committees of the cancer clinics were contacted regularly throughout the year. Two special teaching clinics have been conducted by the Massachusetts Medical Society for the staffs of the cancer clinics which were very well attended. Members of the Division have visited the clinics regularly throughout the year. A score sheet for the cancer clinics has been prepared and a member of the Division scores the clinics as they are being visited. It is estimated that the attendance at the clinics this year will be 4,000. This is the largest attendance of any year since the opening of the clinics. The proportion of cancer remains about the same as in other years, 24 per cent.

Pondville Hospital.—After apparently having reached its ultimate capacity last year, Pondville has again shown an amazing increase in both admissions and medical service. With no additional beds, over 200 more patients were admitted than during the previous year, a total of 1,220. This was made possible by increased work by the resident staff together with more frequent visits by members of the visiting staff. Admissions and discharges have been handled much more efficiently. While the number of hospital admissions has increased 18 per cent, the average length of stay of each patient has been reduced from 44 days to 37 days. The quickened turnover of house patients has been somewhat helpful in reducing the waiting list but this yet remains between 60 and 70. The number of operations increased 36 per cent during the year. Autopsies increased 21 per cent while the number of deaths increased but 1.2 per cent. In the out-patient department the average attendance at the Thursday clinics rose from 43 to 53, and the total out-patient visits from 3,501 to 4,429. The persistence of the long waiting list in spite of marked increase in the admission of cancer patients to general hospitals and after the opening of the Rose Hawthorne Lothrop Cancer Hospital in Fall River is sufficient evidence of the urgent need for additional facilities for patients at Pondville. Plans for an adequate service and surgical building and a twenty-five-bed wing on the hospital building have been approved by the Emergency Public Works Commission and funds for their construction will soon be available.

IV. Environmental Control

The rainfall throughout the State for the year ending December 31, 1933 was 5.69 inches in excess of the normal, the total rainfall for the period being 50.22 inches. There was a deficiency of rainfall in the months of January, May, June, July, November and December. The total deficiency for the three months of May, June and July was the greatest for this period since 1913. There has been an excess of rainfall in all of the other months. The rainfall throughout the State in September was the highest of any month in the past 44 years.

The only shortage of water supply reported throughout the State was that of the town of Shrewsbury.

As was the case in the years 1931 and 1932 industrial activities throughout the State have been considerably less than in more normal years of industry. This condition, together with the excessive rainfall, resulted in no complaints to the Department of serious pollution of streams except in the case of the Aberjona, Salisbury Plain, and Nashua Rivers.

The Engineering Division has been particularly active throughout the year in advising cities and towns and State institutions in regard to water supply and sewage disposal projects proposed for undertaking under the National Industrial Recovery Act through the Public and Civil Works Administrations. As a result of this advice many municipalities have applied for loans and construction work has already commenced on some of the projects. Similar activities were undertaken at some of the State institutions, especially in connection with those under the supervision of the Department of Public Health, where work is proposed for the reconstruction of the sewage disposal works at the Westfield and Lakeville State Sanatoria, and the separation of the storm water from the sewage at the Rutland State Sanatorium. Plans have also been prepared for certain fire protection work at the tuberculosis sanatoria and at the Pondville Hospital.

The Engineering Division did a great deal of work in connection with two special investigations required by resolves of the Legislature. One of these investigations was in connection with the condition of Spot Pond Brook in Malden and Melrose. The other related to the use of certain lands and waters in the Commonwealth for recreational purposes.

A very large amount of time has been devoted to the establishment of some 34 camps for occupancy by the Civilian Conservation Corps in this State. In addition to assisting in the selection of most of the camp sites, investigations were made for sources of water supply and suitable areas for the disposal of sewage. The various camps have been examined a number of times and samples of water collected for bacterial examination at frequent intervals.

Much work has been done in matters relating to shellfish and drainage. In connection with the shellfish work, an act was passed by the Legislature which changed somewhat the general duties of this Department. In this connection the Department has been represented at numerous conferences with representatives of the Department of Conservation, and rules and regulations have been adopted. Under the present arrangements certification, formerly exercised by this Department, is to be carried on by the Supervisor of Marine Fisheries, but the approval of shellfish areas and the operation of the shellfish treatment plants continue to be functions of this Department, and in addition the Department must exercise more supervision in the matter of the importation of out-of-state shellfish shipments and in the tagging of shellfish.

During the summer an extensive survey was made of various bathing places. In this connection the Engineering Division's activities and those of the Water and Sewage Laboratories have related to the sanitary surveys of certain bathing places and the collection of large numbers of samples of water and mud at these beaches for bacterial examination. In addition, surveys were made to determine the amount of water available for diluting the pollution from those using these resorts. The results of these investigations are to be included in a special report.

As a result of the many activities which the Engineering Division has been called upon to perform during the past year, it has been impracticable to examine as many of the recreational camps and roadside stands as has been the practice in recent years. That there is need for more careful supervision, especially of roadside stands, is illustrated by the cases of typhoid fever found in the town of Rockport at such a stand.

Following Mr. Clark's retirement, the Division of Water and Sewage Laboratories was placed under the direction of the Division of Sanitary Engineering. A large amount of work has been done in these laboratories and much field work was done in connection with rivers, water supplies and sewage filtration areas and considerable study was given to the condition of shellfish and shellfish areas. Research work on methods of sewage purification and water treatment was carried on at the Lawrence Experiment Station by different methods of filtration. Also, the important study begun four years ago in regard to the purification of the very polluted Merrimack River water by storage was continued throughout the year. Studies were also continued on the disposal of wastes from gas plants and further work was carried on in regard to the removal of caustic lime from the wastes of industrial plants handling leather, felt and gelatin as this type of waste forms a progressively thickening scale of calcium carbonate in the sewers.

The Food and Drug Division examined 14,627 samples, which is somewhat less than were examined last year. There were 5,125 samples of milk for chemical analysis and 3,682 samples for bacteriological analysis. The milk this year was exceptionally good. The number of samples showing watered milk was the lowest on record. This was usually about 2 or 3 per cent of the total samples collected, but in 1931 and 1932 it dropped below 1 per cent and this year it was 0.39 per cent. The average composition of the milk was exceptionally high. All the samples, including skimmed and watered samples, had an average composition of 12.62 per cent total solids and 3.90 per cent fat. This is very nearly equal to what is required for Grade A milk. The bacteriological samples were reduced by paying more attention to samples ready for delivery to the consumer and less attention to the raw milk in the pasteurizing plants. The pasteurizing plants were examined as usual and particular attention paid to those where the proprietors sold on the market milk with a high bacterial count.

The number of food samples increased somewhat, due to the discovery that the sale of decomposed meat was on the increase. On that account there was an increase in prosecutions. Out of 359 cases brought before the courts, 331 resulted in convictions.

The usual routine examinations of bakeries, slaughterhouses and mattress factories were made during the year. Very few violations were found.

V. Personnel

The organization of the Public Health Council has not changed during the past year, the Governor having reappointed Dr. Lally and Dr. Lee at the expiration of their terms.

The resignation of Dr. George H. Bigelow and the appointment of Dr. Henry D. Chadwick as Commissioner of the Department have been referred to elsewhere in the report.

Effective May 31, 1933, Dr. G. Fletcher Reeves resigned as part-time Epidemiologist of the Department at the same time he submitted his resignation as Director of the Nashoba Associated Boards of Health. On June 1 Dr. James O. Wails was appointed to fill the vacancies caused by Dr. Reeves' resignations.

Dr. Nettie Pidgeon, one of the Child Welfare Physicians working with the Chadwick Clinics in the Division of Tuberculosis, resigned on July 15, 1933. This vacancy was not filled.

On September 1, 1933, Dr. John J. Poutas, who had formerly been employed as Epidemiologist in the Division of Tuberculosis, was reinstated as Epidemiologist in the Division of Communicable Diseases in the position made vacant by the resignation of Dr. Frederick S. Leeder on August 31.

The compulsory retirement on September 15, 1933 of Mr. Harry W. Clark, Director of the Division of Water and Sewage Laboratories, who had been with the Department since 1888, is referred to elsewhere in this report.

Dr. Benjamin White, who had been Director of the Division of Biologic Laboratories since 1920, was forced by ill health to resign on October 17, 1933. Effective October 18, Dr. Elliott S. Robinson, formerly Assistant Director, was appointed as Director of the Division. Dr. Roy F. Feemster, Assistant Director of the Division of Communicable Diseases, was transferred temporarily as Assistant Director of the Division of Biologic Laboratories, and Dr. Wheelan D. Sutliff was appointed in the Division of Communicable Diseases to serve during Dr. Feemster's absence.

On November 15, 1933, Miss Ada Boone Coffey was appointed as Chief Consultant in Public Health Nursing, a position vacant since the resignation of Miss Mary P. Billmeyer.

VI. Organization

The organization of the Department is as follows:

Commissioner of Public Health	1
Public Health Council	6
Division of Administration:	
Secretary (1), Epidemiological Consultant (1), Clerks and Stenographers (11)	13
Division of Adult Hygiene:	
Herbert L. Lombard, M.D., Director.	
Epidemiologists (2), Social Workers (2), Public Health Education Workers (2), Field Epidemiologist (1), Clerks and Stenographers (15)	23
Division of Biologic Laboratories:	
Elliott S. Robinson, M.D., Director.	
Assistant Director (1), Chemists and Bacteriologists (8), Laboratory Assistants (3), Laboratory Helpers (8), Stable Foreman (1), Laborers (14), Janitors (2), Clerks and Stenographers (6).	
(Wassermann Laboratory):	
Chief of Laboratory (1), Bacteriologist (1), Laboratory Technician (1), Laboratory Assistant (1), Laboratory Helpers (5), Clerks and Stenographers (3)	56
Division of Communicable Diseases:	
Gaylord W. Anderson, M.D., Director and Deputy Commissioner.	
Assistant Director (1), District Health Officers (7), Epidemiologists (3), Clerks and Stenographers (8).	
(Diagnostic Laboratory):	
Bacteriologists (4), Laboratory Assistant (1), Laboratory Helper (1), Laborer (1), Clerks (2).	
(Venereal Diseases):	
Assistant Director (1), Epidemiologist (1), Public Health Social Hygiene Supervisor (1), Public Health Education Worker (1), Clerks and Stenographers (2)	35

Division of Food and Drugs:	
Hermann C. Lythgoe, Director.	
Chief of Laboratory (1), Chemists and Bacteriologist (5), Veterinary Food Inspectors (3), Food Inspectors (7), Laboratory Helpers (2), Laborers (2), Clerks and Stenographers (7)	28
Division of Child Hygiene:	
M. Luise Diez, M.D., Director.	
Child Welfare Physician (1), Epidemiologist (1), Public Health Dental Hygiene Supervisor (1), Public Health Nutrition Workers (3), Public Health Education Workers (2), Clerks and Stenographers (8).	
(Maternal and Child Hygiene):	
Child Welfare Physician (1), Public Health Nursing Supervisors (5), Clerks and Stenographers (6)	29
Division of Sanitary Engineering:	
Arthur D. Weston, Chief Sanitary Engineer.	
Engineers and Engineering Assistants (15), Clerks and Stenographers (12)	
(Water and Sewage Laboratories):	
Chief of Laboratory (1), Chemists and Bacteriologists (10), Laboratory Assistant (1), Mechanical Handyman (1), Laborer (1), Watchman (1), Clerks and Stenographers (3)	46
Division of Tuberculosis:	
Alton S. Pope, M.D., Director.	
Assistant Director (1), Epidemiologist (1), Superintendent of Sanatoria Construction (1), Inspector of Settlements and Support Claims (1), Social Workers (2), Field Nurse (1), Clerks and Stenographers (9).	
(Tuberculosis Clinics):	
Supervisors of Tuberculosis Clinics (2), Child Welfare Physicians (4), Field Nurses (4), Public Health Nutrition Workers (3), X-ray Clinic Field Agents (2), Clerks and Stenographers (9)	41
Total	278

VII. Publications

The following articles by members of the staff have been published:

Division of Administration

Cancer and Other Chronic Diseases in Massachusetts —
George H. Bigelow, M.D. and Herbert L. Lombard, M.D.
Houghton Mifflin Company, 1933.
Program for Tuberculosis Control in Massachusetts —
George H. Bigelow, M.D. and Alton S. Pope, M.D.
New England Journal of Medicine, 208: 251–253, February 2, 1933.
Cure of Typhoid Carriers —
George H. Bigelow, M.D. and Gaylord W. Anderson, M.D.
Journal of the American Medical Association, 101: 348–352, July 29, 1933.
Milk-Borne Disease in Massachusetts, 1930–1932 —
George H. Bigelow, M.D. and Roy F. Feemster, M.D.
American Journal of Public Health, 23: 571–576, June, 1933.
What are Death Rates in Massachusetts Doing? —
George H. Bigelow, M.D. and Angeline D. Hamblen
New England Journal of Medicine, 208: 1313–1316, June 22, 1933.
Diphtheria Immunization and the Private Practitioner —
George H. Bigelow, M.D. and Gaylord W. Anderson, M.D.
New England Journal of Medicine, 208: 781–782, April 13, 1933.
Diphtheria Immunization in Private Practice —
George H. Bigelow, M.D. and Gaylord W. Anderson, M.D.
American Journal of Public Health, XXIII, July, 1933.

Division of Adult Hygiene

The Dentist and Public Health —
Herbert L. Lombard, M.D.
The Mouth Health Quarterly, 2: No. 4, July, 1933.
Appendicitis Campaign —
The Apothecary, April and May, 1933.
The Burden of Chronic Disease —
Herbert L. Lombard, M.D.
Hospital Social Service, XXVII: No. 5, 1933.

Division of Biologic Laboratories

A Test for Reaction-Producing Substances in Concentrated Anti-pneumococcic Serum. Preliminary Report.
L. A. Barnes, Ph.D. and S. D. Kramer, M.D.
American Journal of Public Health, XXIII: No. 6, June, 1933, p. 616.
The Reactions of Halicystis and Valonia to Injections of Certain Proteins —
E. M. East and Benjamin White, Ph.D.
Journal of General Physiology, XVI: 6, July 20, 1933, p. 937.

Division of Child Hygiene

Childhood's Greatest Need —
Susan M. Coffin, M.D.
Hospital Social Service, XXVII, No. 5, May, 1933, p. 573.
Dental Health in Massachusetts —
Eleanor G. McCarthy,
Journal of the American Dental Association, XX: No. 3, March, 1933, p. 551.

Division of Communicable Diseases

The Relation of Smallpox Morbidity to Vaccination Laws —
Samuel B. Woodward, M.D. and Roy F. Feemster, M.D.
New England Journal of Medicine, 208: 317–318, February 9, 1933.
The Nurse in Control of Gonorrhea and Syphilis —
N. A. Nelson, M.D.
Public Health Nursing, XXV: 199–204, April, 1933.
The Follow-Up of Gonorrhea and Syphilis in Private Practice —
N. A. Nelson, M.D.
New England Journal of Medicine, 208: 1153–1157, June 1, 1933.
A Scarlet Fever Outbreak Due to Raw Milk —
Roy F. Feemster, M.D. and J. M. Kingston, D.V.S.
New England Journal of Medicine, 209: 275–278, August 10, 1933.
Experimental and Statistical Evidence of the Particulate Nature of Bacteriophage —
Roy F. Feemster, M.D. and W. F. Wells, S.B.
Journal of Experimental Medicine, 58: 385–391, October 1, 1933.
Two Years' Study of Lobar Pneumonia in Massachusetts —
Roderick Heffron, M.D. and Gaylord W. Anderson, M.D.
Journal of the American Medical Association, 101: 1286–1289, October 21, 1933.
A Simple, Diagramatic Interpretation of Blood Tests in the Diagnosis and Treatment of Syphilis, which may be Used for the Information of the Patient—
Walter T. Garfield, M.D. and N. A. Nelson, M.D.
New England Journal of Medicine, Vol. 209: 1016–1017, November 16, 1933.

Division of Sanitary Engineering

Topographical Mapping in Massachusetts —
Clarence I. Sterling, Jr.
Journal of the Engineering Societies of Boston, April, 1933.
Chairman's Address at the Annual Meeting on June 6, 1933 —
Arthur D. Weston
Journal of the Engineering Societies of Boston, July, 1933.
The Great Storm of September 16 and 17, 1932 —
George V. White
Journal of the New England Water Works Association, June, 1933.

Rainstorm of September 16–17, 1932, in New England —
George V. White
Bulletin of American Meteorological Society, January, 1933.
Shellfish Treatment Plant at Newburyport, Mass. —
Edward Wright
American Journal of Public Health, December, 1933.

Division of Tuberculosis

Pulmonary Tuberculosis in Adolescents with Special Reference to Frequency Diagnosis and Prognosis —
Alton S. Pope, M.D.
New England Journal of Medicine, 209: 765, October 19, 1933.
The Sanatorium Treatment of Lupus —
Louis Alpert, M.D.
American Review of Tuberculosis, 27: 515, May, 1933.
Human and Bovine Infection in Extra-Pulmonary Tuberculosis —
Chin S. Chang, M.D.
New England Journal of Medicine, 209: 690, October 5, 1933.
Cysts of the Prostate —
Roger Graves, M.D. and C. J. E. Kickham, M.D.
New England Journal of Medicine, 209: 367, August 24, 1933.
What We Have Learned from Five Hundred Spinal Anesthesias —
Frank H. Washburn, M.D.
New England Journal of Medicine, 209: 345, August 17, 1933.
Primary Carcinoma of Bronchus —
G. Arnold Rice, M.D.
New England Journal of Medicine, 209: 341, August 17, 1933.
Prolonged Bed Rest in Pulmonary Tuberculosis —
Paul Dufault, M.D.
New England Journal of Medicine, 209: 184, July 27, 1933.
The Calcium, Potassium, and Inorganic Phosphate Content of the Serum in Cancer Patients. The Effect of Roentgen Ray Radiation on the Level of these Substances in the Blood Serum of Cancer Patients —
Henry Jackson, Jr., M.D. and F. H. L. Taylor, M.D.
American Journal of Cancer, XIX, No. 2, 379, October, 1933.

VIII. LEGISLATION

The Department is submitting the following proposed legislation:

1. *Relative to Equalizing the Rates at State and County Sanatoria*

For the more effective use of the county and state tuberculosis sanatoria, the direct charge to cities and towns should be approximately the same for both types of institutions. As it is now, the direct charge is greater in state than in county sanatoria and for that reason vacant beds are not used for patients on waiting lists of county institutions. The effect of this is to deprive them of treatment they might otherwise obtain. It actually reduces the state income more than it might have been with more city and town cases paying a somewhat lower rate.

The accompanying bill does not state what the direct charge should be but leaves this to be determined by the Department, the purpose being to make more nearly uniform the charges to municipalities for the care of tuberculous patients.

2. *Relative to Requiring Vaccination of Children in Private Schools*

The General Laws at present require smallpox vaccination of children as a prerequisite to public school attendance. While this has been effective in keeping the incidence of the disease at a figure lower than that of any other state in the Union, this protection to the community has come from the enforcement of this provision upon those who could not afford to go to a private school. This means, then, that those financially able to attend a private school can purchase their protection at the expense of those less favorably situated. The proposed amendment in extending the compulsory vaccination to include private schools would provide for equal participation on the part of all, thus avoiding any suggestion of what may well be called at present class legislation. In addition, it would prevent the occasional case of smallpox that occurs from time to time among children who have evaded or escaped vaccination through private school attendance.

IX. FINANCIAL STATEMENT

Appropriations and Expenditures for the Year ended November 30, 1933

	Appropriations Plus Amounts Brought Forward	Expenditures to November 30
Division of Administration	$36,009.19	$32,777.35
Division of Adult Hygiene	75,004.25	72,564.82
Division of Child Hygiene	50,219.89	46,433.59
Maternal and Child Hygiene	30,969.11	29,519.89
Division of Communicable Diseases	84,152.48	82,079.94
Venereal Diseases	41,026.31	38,475.83
Division of Food and Drugs	59,837.50	59,657.92
Administration of Shellfish Law	2,860.00	2,779.85
Division of Biologic Laboratories:		
Antitoxin and Vaccine	101,584.51	97,601.35
Wassermann Laboratory	20,990.00	20,570.66
Division of Sanitary Engineering	84,586.86	83,447.64
Division of Water and Sewage Laboratories	47,661.56	46,176.73
Division of Tuberculosis	39,178.38	38,928.68
Subsidies to Cities and Towns	405,000.00	404,167.17
Tuberculosis Clinic Units	85,847.34	78,814.24
	$1,164,927.38	$1,133,995.66

Receipts for Year ended November 30, 1933

Licenses, etc.	$2,571.71

State Sanatoria and Pondville Hospital

Appropriations and Expenditures for the Year ended November 30, 1933

	Total Appropriations	Expenditures to Nov. 30, 1933
Lakeville State Sanatorium	$257,391.76	$246,866.10
North Reading State Sanatorium	220,214.38	207,810.34
Rutland State Sanatorium	285,786.44	275,502.56
Westfield State Sanatorium	230,213.28	219,627.08
Pondville Hospital	229,265.42	220,048.49
Lakeville:		
Acts 1931, Chap. 1, Item S, "Alteration of Two Buildings"	17,000.00	16,672.17
North Reading:		
Acts 1930, Chap. 115, Item 639 Acts 1932, Chap. 170, Item 3 — "Employees Building"	75,000.00	72,406.08
Acts 1929, Chap. 146, Item 592 Acts 1930, Chap. 115, Item 636 Acts 1931, Chap. 245, Item 569 — "Improving Water Supply and Fire Protection"	42,700.00	42,700.00
Acts 1929, Chap. 146, Item 590 Acts 1931, Chap. 245, Item 570 — "Admission and Isolation Building"	172,000.00	172,000.00
Acts 1931, Chap. 1, Item U, "Repairs and Improvements"	8,600.00	8,600.00
Acts 1932, Chap. 69, Item H, "Certain Filter Beds"	17,000.00	16,473.51
Rutland:		
Acts 1932, Chap. 170, Item 554, "Medical Building Equipment"	7,200.00	7,179.70

Receipts

	Amount
Lakeville State Sanatorium	$120,324.32
North Reading State Sanatorium	79,139.92
Rutland State Sanatorium	191,343.71
Westfield State Sanatorium	75,162.53
Pondville Hospital	60,415.59

HENRY D. CHADWICK, M.D.,
Commissioner of Public Health.

REPORT OF DIVISION OF ADULT HYGIENE

Herbert L. Lombard, M.D., *Director*

During the present year, the Division of Adult Hygiene has devoted approximately 85 per cent of its time to the cancer program, 10 per cent to appendicitis, and the remainder to other chronic diseases.

All contributions by the State employees to the Boston Emergency Relief Campaign were handled by the Division.

The Cancer Clinic Bulletin was issued for the first time in April of this year. The bulletin contains all the latest information and announcements pertaining to cancer work. It is mailed to approximately 215 persons doing cancer work in the clinics.

A cancer number of the Commonhealth was issued. The papers were assembled by the Division.

Dr. Lombard presented a paper, "The Change in the Massachusetts Cancer Trend," on May 8, 1933, at the annual meeting of the American Epidemiological Society held at Washington, D.C.

Dr. Lombard presented a paper, "Results of an Appendicitis Campaign," on November 27, 1933, at the annual meeting of the American Association for the Advancement of Science held at Boston, Mass.

Education

During the year, the educational activities have continued.

The radio service continues active. There were 151 broadcasts in all. Thirty-seven of these comprise the series jointly sponsored by the Massachusetts Medical Society and this Department, and broadcast by members of the Medical Society. The subjects covered are varied and aim to provoke interest in preventive and control measures.

Fifty-one broadcasts were given by the Divisional Directors or their appointees. This series was instituted, at request of the Station, to give much-needed information about the various activities of the Department. For the past two years these broadcasts have become broadened in scope.

Fifty broadcasts of the Radio Health Forum were given. Each Forum consists of a timely foreword on some phase of public health, questions from the public and the answers to them.

A series of thirteen health plays was presented over the radio through the courtesy of the WBZ players.

The Newspaper Health Forum is now being mailed weekly to sixty-five newspapers throughout the State. This represents an increase of twelve over last year.

The General News Release and the State Clinic Release are sent out on alternate months, the General Release going to all newspapers in the State and the State Clinic Release going to the press chairmen of the cancer educational committees. These chairmen in turn send them to the newspapers in their particular zone.

Approximately ten thousand pieces of literature have been distributed.

Nearly five thousand inches of newspaper publicity, exclusive of the Health Forum, have been received from the Clipping Bureau during the year. This is two thousand less inches than in 1932, but is similar to 1931. In the present year, no extensive publicity was attempted as there was in 1932 for the Achievement Week.

For the second year we have circularized the hospital training schools, offering to supply the graduating class with cancer literature. About one-third of the hospitals applied for literature.

Thirty-four lectures have been given, with a total attendance approximating twenty-five hundred. The cancer films have been shown thirteen times to approximately thirteen hundred persons. The biology students in six colleges have requested the Canti film to be shown. The delineascope, prepared last year, has been shown to the various educational committees of the cancer clinics.

The University Extension Course on "How to Keep Healthy" was given again this year.

Publicity for the Boston, Newton, Worcester, Pittsfield, and New Bedford cancer clinics was carried on for short periods of time by the Division and also the publicity for the special Worcester clinic.

The Health Score Card was prepared and distributed to about five hundred individuals. Each individual is to score himself monthly and a total scoring of one thousand points for twelve months means health perfection.

An exhibit of health education material and charts was on display at the annual meetings of the Federation of Women's Clubs and the Massachusetts Medical Society.

The week of June 12th was set aside as "Appendicitis Week." The Boston Health League, druggists' associations, and insurance companies cooperated. Fifteen hundred posters were displayed and twenty-five thousand flyers were distributed by drug stores, hospitals, and other organizations. The Boy Scouts of America assisted by placing the posters and flyers in the Boston drug stores. Broadcasts and lectures were given by members of the Division and others, informing the public of the campaign.

The educational committees of the cancer clinics were contacted regularly throughout the year. There were a few resignations which necessitated the selection of new members and chairmen.

Two members of the Division attended the meetings of the American Public Health Association held in Indianapolis during October.

STUDIES

The following studies were conducted during the year:

Cancer and Other Chronic Diseases: The results of the past four years' activities in cancer and other chronic diseases were published in book form.

Cancer and Tuberculosis: The death records are being collected as a continuation of the study started last year.

Rockefeller Study: Work on this study has been progressing. This includes investigation into the etiology of cancer and the evaluation of the cancer mortality records.

Appendicitis: Most of the large hospitals have been contacted and the appendicitis records copied for the three months immediately preceding and following the Appendicitis Campaign Week of June 12, 1933, to obtain epidemiological data.

Influenza: A short study was made on this subject.

Change in Massachusetts Cancer Trend: A study was made on the change of the cancer trend in Massachusetts.

Weight and Morbidity: The chronic disease survey cards were studied in more detail to determine what relation existed between weight and morbidity. The analysis is progressing.

Chronic Rheumatism in Massachusetts: An analysis of the figures obtained in the hospital survey has been completed and a paper prepared.

Changing Vital Statistics: An analysis of the changes in the Massachusetts Vital Statistics between 1870 and 1930 is being made.

Evaluation of Radio Programs: Questionnaires were mailed to approximately three thousand individuals regarding the radio programs. An analysis of the data is being made.

Periodic Physical Examination: A study of the literature dealing with periodic physical examination was made and a paper prepared on the subject.

Cancer Clinic Social Service Follow-Up: A study of the cancer patients from admission to death is being continued.

STATISTICAL ASSISTANCE RENDERED

Statistical assistance has been furnished several physicians and dentists in the preparation of papers. They have covered various fields, but the majority have been on cancer. Help has also been furnished regarding the mechanics of statistics such as preparing codes.

Tables have been compiled and sent to the New York Health Department, Metropolitan Life Insurance Company, and local physicians in response to requests.

TUMOR DIAGNOSIS SERVICE

The work of the laboratory has continued to increase, 2,786 specimens being received for diagnosis—an increase of 188 over the preceding year. This is in spite of a slight drop in the number of surgicals from the Huntington Memorial Hospital.

As in the past, the bulk of the material comes from smaller hospitals and from Massachusetts outside the metropolitan area. This year the service has been utilized by 94 hospitals and 549 surgeons. A list of the hospitals from which specimens have been received is appended (Table XIX). The number of conferences with the surgeons using the service has increased, and the pathologist is not infrequently called upon for suggestions as to radiosensitivity of various of the tumors diagnosed or other questions concerning treatment. Many of the cases from whom specimens have been received ultimately go to the Pondville Hospital. The close relationship between the laboratory here and that at Pondville frequently enables additional biopsies on these cases to be dispensed with, thereby producing a considerable saving.

All the epidermoid carcinomas received in this laboratory have now been graded histologically and the results of this study have been submitted to Surgery, Gynecology and Obstetrics. Publication is expected in a few months. These studies have been of value in clearing up certain disputed points, such as the relation of age to the degree of malignancy, and the sex incidence of certain types of epidermoid carcinomas. A considerable number of skin cancers of various types are now being studied with the hope of working out a closer correlation between histologic appearance and the most satisfactory method of treatment.

Dr. Olive Gates resigned as resident September 1, 1933, to become assistant pathologist at the New England Deaconess Hospital. Dr. Arthur Cloudman, Littauer Fellow in Pathology under the Harvard Cancer Commission for 1932–33, has succeeded Dr. Gates as resident pathologist. The present Littauer Fellow in Pathology, Dr. John Fallon, is at present working in this laboratory. Dr. Marcus E. Farrell served as interne from July 1, 1933, to December 31, 1933.

Social Service

During the year, the social service activities of the cancer clinics have continued as in former years.

Miss Muriel Eales resigned from the Lowell Cancer Clinic and Miss June Sanford was appointed in her place.

Miss Marjorie Toland was appointed social worker at the Brockton Cancer Clinic.

Mrs. Edward Tierney was appointed social worker at the Berkshire County Cancer Clinic.

Programs of observation and study have been arranged for several students and new social worker.

Follow-up work on all former patients of the now defunct Franklin County Cancer Clinic is to be done by the Greenfield V.N.A.

Conferences

The Division was represented at the annual meeting of the Massachusetts Conference of Social Work.

The regular weekly staff conference of the Division has been held throughout the year.

Numerous conferences have been held with various persons regarding cancer educational work, physical health examinations, post-operative follow up, Massachusetts Medical Society cancer clinics, and other items pertinent to the Division.

A meeting of the chiefs of the State-aided cancer clinics was held in Boston in April. Clinic plans and policies were discussed.

State-Aided Cancer Clinics

Two special teaching clinics have been conducted by the Massachusetts Medical Society for the staffs of the cancer clinics. Both of these clinics were very well attended. The first one was held in Boston in October, the second in Worcester in December.

A member of the Division has been visiting the clinics regularly throughout the year, bringing back suggestions and ideas for improvement. This visit also gives the physicians in the clinics an opportunity to bring up their problems and keeps the central office in closer touch with what is going on in the clinics.

A score sheet for the cancer clinics has been prepared and a member of the Division is scoring the clinics as they are being visited.

Several interviews and discussions have taken place regarding the possibility of reopening the Franklin County Cancer Clinic.

Table I. The attendance at the State-aided cancer clinics in 1933 was 3,921—an increase of nearly 15 per cent over the preceding year. More females attended the clinics than males, the percentages being respectively 61.8 and 38.2. Cancer cases comprised 24.8 per cent of the total admissions. Nine hundred and seventy-three individuals with cancer were seen. There is very little change in the percentage of individuals having cancer throughout the years in which the cancer clinics have been in operation. The highest rate in any year was 25.4 in 1930 and the lowest rate 21.0 in 1928. There was an increase of nearly 40 per cent in individuals having precancerous lesions. This is gratifying, as the removal of precancerous lesions is probably the best attack upon the disease at the present time. This year showed the highest percentage of precancerous lesions of any of the years. Only 4 per cent of the individuals coming to the clinics have no pathology. This figure is about the same as that for previous years. The median age of both the cancer patients and the total clinic attendance has remained practically constant throughout the eight years of clinic operation.

Table II. The number of cities and towns from which individuals came to the cancer clinics increased considerably in 1933 over 1932. The number of towns sending one patient only has decreased and those sending more than one have all increased.

Table III. In 1933 the Pondville clinic had about four times as many patients as the next largest clinic and this clinic comprised over one-third of the total clinic attendance. Brockton, Lowell, Lynn and New Bedford had over 300 patients each, the Boston Dispensary and Worcester over 200, and Lawrence, Springfield and Worcester North over 100. Newton and the Berkshire clinics had less than 100 cases. The percentage of cancers varied considerably in the different clinics. Berkshire, Brockton, Lowell, Lynn, New Bedford and Worcester North had rates of less than 20 per cent while the Boston Dispensary, Lawrence and Pondville had over 30 per cent. The rates did not differ greatly from the preceding year for most clinics. A smaller percentage of precancers was found in the Berkshire clinic than in any other, while the largest percentage was found in Pondville.

Table IV. The percentage of cancers subdivided by whether or not the patients were referred by a physician is shown in this table. It is important to determine what the optimum percentage of cancers should be in these clinics. If the figure is too small or too large, cancer phobia or lack of education is probably responsible. Inasmuch as the cases referred by physicians have higher cancer rates than others, the total percentage of cancer is not a good figure to use, as in these clinics the proportion of patients referred by physicians differs. Seven of the clinics had cancer admission rates ranging between 12.7 and 18.0 for individuals not referred by physicians; two had rates over 30; and two under 10. While it is by no means certain, it is believed that the optimum figure for individuals not referred by physicians is somewhere in the neighborhood of 15 per cent.

Table V. The median duration before the first visit by the patient to a physician shows little change between the years 1932 and 1933. However, there is a decrease of about one-half month from the average of the years 1927–1931. On the other hand, the median before the first visit to the clinic shows a duration of one month less in 1933 than in 1932 and a duration of two and one-half months less in 1933 than for the average of the years 1927–1931. Breast and skin cancers came to the clinic at an earlier period in 1933 than in the previous year.

Table VI. The median duration before the first visit to a clinic for total patients has decreased in 1933 from the average of the years 1927–1932 in all groups save that in which more than one physician was consulted, which group has remained constant. In 1927–1932 the duration for breast cancer referred by one physician was 7.7 months. It is now 3.7 months. This is very encouraging, indicating that physicians are referring this type of patient at an earlier stage of the disease than in former years. A similar encouraging finding is in relation to skin cancer in which the interval has decreased from twenty-two months to thirteen months

among those referred by one physician. The individuals who came in for breast cancer without seeing any physician had practically the same duration as those who were referred by the first physician consulted. The early cases of breast cancer seen in the clinics were those sent in by physicians, with those who came of their own accord and had never seen a physician, second.

Table VII. The percentage of cancer patients coming to the clinics referred by physicians has increased, and now over two-thirds of all cancer patients seen at the clinics have been referred by physicians. Those referred by newspapers have decreased. The percentage of patients with precancerous lesions referred by physicians has increased as has also the total patients. It would appear that the clinics are becoming each year more and more consultation clinics. There was a considerable increase among the patients with both cancer and precancer who came for "all other" reasons. This increase is largely attributed to the number of former clinic patients who returned with a new lesion.

Table VIII. The percentage of individuals coming to the clinics at the advice of a physician has increased and those coming because of newspaper publicity has decreased for the clinics as a whole. This decrease is noted in every clinic with the exception of Lawrence, Lynn, New Bedford and Worcester, which show increases. The Berkshire clinic shows the smallest percentage of individuals referred by physicians and the Pondville clinic the greatest percentage. The Boston Dispensary clinic shows a large increase in the number being referred by physicians. Apparently the trend is toward more physician-referred patients to the clinics and newspaper-referred less. In the first years of the clinics about two-thirds of all cases came because of newspaper publicity. For the last two years the only clinics that approach this are the Berkshire and the Brockton clinics.

Table IX. Cancer patients who came to the clinics referred by physicians comprised 68.3 per cent of all cancer cases in 1933 and 64.0 per cent in 1932. Increases were noted in all types of cancer with the exception of digestive tract and buccal cavity. The radio was almost negligible in bringing cancer patients to the clinics and the newspapers were far less important than in the earlier years of the clinics. The percentage of cases coming from past experience has increased for most of the types of cancer.

Table X. The percentage distribution of cancers in 1933 showed larger percentages of uterus and skin, with a falling off of digestive tract and breast. The other types were about the same.

Table XI. The diagnoses of previous years were changed in 1933 in sixty-two cases. Forty-two of these were changed from non-malignant conditions to cancer, and twenty, which had previously been diagnosed cancer, were changed to non-cancer.

Table XII. The contact of the patients with physician is shown in this table. Of the total cancer patients coming to the clinics, 15 per cent had never consulted a physician, 16 per cent had consulted one or more physicians but had come of their own volition, 39 per cent had consulted one physician and were referred by him, and 29 per cent had consulted more than one physician and had been referred by the last one consulted.

Table XIII. The distribution of the cancer cases in the group that came directly to the clinic without consulting a physician differed radically from the other three groups. This group showed a larger percentage of skin cancers, breast cancers and buccal cavity cancers, and a much smaller percentage of all other groups. Apparently educational activities are not being felt as well in cancer of the uterus as in the mouth, breast and skin.

Table XIV. The percentage of individuals coming to the clinics who had never seen a physician prior to their clinic visit was less in 1933 than in 1932. The present figures indicate that about one-sixth of the cancers seen at our clinics make their first medical contact at that place. The percentage of individuals who had seen two or more physicians increased.

Table XV. The symptoms that first brought patients to the clinics closely resembled those of previous years. It is disappointing to note that so large a percentage of the cancer patients come because of pain. There was no difference between the 1933 rate for pain and that of previous years. As pain is usually a late symptom in cancer, this would indicate that the public is not yet aroused to the importance of seeking medical advice at an early period.

Table XVI. Among males the percentages of operable cancer with probable cure remained constant for 1932 and 1933, and the percentages of operable cancer with possible cure showed an increase in 1933. Among females there was an increase in 1933 in the operable cancers with probable cure and a decrease in those with possible cure. Breast cancer had nearly 4 per cent more operable cancer with probable cure than in the preceding year, but cancer of the uterus showed a decrease. It is discouraging to note that only 23 per cent of the breast cancers were in the probable cure class. The optimum should be around 70 per cent. It is equally discouraging to realize that less than 7 per cent of cancers of the uterus came at an early stage of the disease.

Table XVII. Whereas 41 per cent of the males and 32 per cent of the females were classified as operable cancer with probable cure, there was considerable variation in the individual clinics. In the male group, Springfield, Brockton, Lynn and New Bedford listed their probable cures as over 10 per cent greater than the totals, while Lowell felt that less than 17 per cent were in that class. In the female group, Berkshire, Boston Dispensary, Brockton, Lawrence and Springfield greatly exceeded that for totals, whereas New Bedford found only about 4 per cent of their cases in this classification, Lowell 14 per cent, Worcester 16 per cent, and Pondville 30 per cent. This great discrepancy is probably due largely to different interpretations in the clinics, as it does not seem reasonable to believe that such great differences actually occurred between individuals coming to the clinics as appeared between Berkshire and New Bedford.

Table XVIII. The diagnosis of various conditions found in the clinics is shown in this table. As some individuals had more than one condition, there were more diagnoses given than the total number of patients. Cancers comprised the largest percentage with benign tumors second, and precancerous lesions third. Of the non-malignant conditions, diseases of the digestive tract were the most common.

TABLE I. — *Attendance at State-Aided Cancer Clinics*

	1932	1933
Total patients	3,427	3,921
Cancer	793	973
Precancerous lesions	329	453
Deferred diagnosis	114	112
Undiagnosed	27	28
No pathology	167	172
Post-operative, no evidence of recurrence	50	102
All other conditions	1,947	2,081
Percentage with cancer	23.1	24.8
Percentage with precancerous lesions	8.8	11.6
Median age of total clinic patients	47.5	49.4
Median age of cancer patients	60.6	61.0

TABLE II. — *Residents of Massachusetts Cities and Towns Attending State-Aided Cancer Clinics*

	1932	1933
Number of places with 1 patient	73	63
Number of places with 2–5 patients	63	70
Number of places with 6–9 patients	36	38
Number of places with 10 patients and over	55	74
Total number of places	227	245

TABLE III. — *Attendance at State-Aided Cancer Clinics, by Individual Clinic*

	1933					1932
CLINIC	ADMISSIONS* MALES	ADMISSIONS* FEMALES	ADMISSIONS* TOTAL	PERCENTAGE PRECANCER	PERCENTAGE CANCER	PERCENTAGE CANCER
Berkshire	14	24	38	5.3	13.2	14.5
Boston Dispensary	122	164	286	17.1	30.4	27.5
Brockton	133	229	362	9.1	19.9	16.1
Lawrence	48	77	125	8.0	38.4	29.2
Lowell	127	252	379	11.6	16.6	15.0
Lynn	139	240	379	7.7	19.8	16.4
New Bedford	118	247	365	7.7	15.3	22.4
Newton	1	4	5	20.0	0.0	20.0
Pondville	642	874	1,516	18.0	33.8	31.8
Springfield	58	130	188	6.4	20.7	14.3
Worcester	99	168	267	7.1	25.1	31.3
Worcester North	42	92	134	11.9	18.7	13.8

*Some individuals went to more than one clinic.

TABLE IV. — *Cancer Rate Subdivided by Whether or Not Patients Were Referred by Physician, by Individual Clinic*

Rate per 100

	1933		
CLINIC	REFERRED BY PHYSICIAN	NOT REFERRED BY PHYSICIAN	TOTAL
Berkshire	33.3	9.4	13.2
Boston Dispensary	30.0	30.9	30.4
Brockton	44.5	13.6	19.9
Lawrence	48.2	31.0	38.4
Lowell	27.9	12.7	16.6
Lynn	28.7	16.2	19.8
New Bedford	32.2	4.9	15.3
Newton	–	–	0.0
Pondville	39.7	18.0	33.8
Springfield	35.4	15.7	20.7
Worcester	44.4	15.6	25.1
Worcester North	26.0	14.7	18.7

TABLE V. — *Median Duration in Months Between First Symptom and First Visit to Physician and First Visit to Clinic, by Location of Cancer*

LOCATION OF CANCER	Median Duration Before First Visit to Physician		Median Duration Before First Visit to Clinic	
	1932	1933	1932	1933
Buccal Cavity	3.8	6.0	6.0	7.1
Digestive Tract	3.3	4.1	6.9	6.9
Respiratory System	2.5*	4.0*	5.5*	8.5*
Uterus	3.3	4.3	6.3	6.9
Other Female Genital Organs	6.7*	5.5*	13.5*	6.8*
Breast	6.1	3.4	8.0	6.0
Male Genito-Urinary Organs	2.6	6.1*	7.5	8.8
Skin	12.5	12.5	24.2	18.5
Other and Unspecified Organs	5.8	4.8	8.5	9.0
Total Patients**	6.1	6.2	10.4	9.4

*Based on less than 25 cases.
**Some individuals had more than one cancer.

TABLE VI. — *Median Duration of Cancer Symptoms before First Visit to Clinic, by Contact with Physician and by Location of Cancer*

LOCATION OF CANCER	1933			
	REFERRED BY PHYSICIAN		NOT REFERRED BY PHYSICIAN	
	One Physician Consulted	More Than One Physician Consulted	One or More Physicians Consulted	No Physicians Consulted
Buccal Cavity	7.0 months	8.0 months	11.0 months	6.6 months
Digestive Tract	6.1 months	10.0 months	9.5 months	*
Respiratory System	6.0 months	15.5 months	*	*
Uterus	6.2 months	8.0 months	12.5 months	*
Other Female Genital Organs	*	7.0 months	*	*
Breast	3.7 months	18.8 months	6.4 months	3.9 months
Male Genito-Urinary Organs	4.5 months	10.0 months	*	*
Skin	13.0 months	Over 2 years	21.6 months	12.6 months
Other and Unspecified Organs	6.5 months	12.5 months	*	*
Total Patients**	6.9 months	12.0 months	12.6 months	8.0 months
Total Patients 1927-1932**	9.1 months	12.1 months	15.6 months	11.1 months

*Median not well established.
**Some individuals had more than one cancer.

TABLE VII. — *Reason for Coming to Clinic, by Diagnosis*

Rate per 100*

REASON	CANCER		PRECANCEROUS LESIONS		TOTAL PATIENTS	
	1932	1933	1932	1933	1932	1933
Physician	64.0	68.3	49.8	52.9	42.7	47.4
Friends or Relatives	9.5	8.6	12.2	8.4	13.1	13.6
Newspapers	12.3	10.4	23.8	19.2	25.2	23.6
All Others	14.5	22.3	16.2	26.0	20.0	21.3

*Does not total to 100 per cent as some individuals gave more than one reason.

TABLE VIII. — *Reason for Coming to Clinic, by Individual Clinic for Total Admissions*

Rate per 100*

CLINIC	PHYSICIAN		FRIENDS OR RELATIVES		NEWSPAPERS		ALL OTHERS	
	1932	1933	1932	1933	1932	1933	1932	1933
Berkshire	15.9	15.8	15.9	10.5	66.7	57.9	20.3	15.8
Boston Dispensary	26.0	60.5	16.2	17.5	9.3	1.4	49.5	20.6
Brockton	22.8	20.5	9.5	14.7	60.5	58.7	9.5	7.5
Lawrence	49.3	43.2	11.8	17.6	20.1	28.8	20.1	11.2
Lowell	21.6	25.6	19.7	24.8	45.8	41.2	14.3	10.0
Lynn	32.4	28.6	8.6	7.9	36.3	41.0	22.6	24.1
New Bedford	55.1	38.4	10.8	12.6	22.9	38.1	11.7	11.5
Newton	60.0	40.0	20.0	20.0	0.0	20.0	20.0	20.0
Pondville	67.6	72.9	13.6	10.1	0.3	0.3	18.6	33.2**
Springfield	25.2	25.5	16.4	29.3	47.5	30.3	10.9	14.9
Worcester	37.8	35.2	6.9	3.0	17.6	35.9	39.0	27.7
Worcester North	31.0	34.3	13.8	14.2	34.8	32.8	20.4	18.7
Total Patients***	42.7	47.4	13.1	13.6	25.2	23.6	20.0	21.3

*Does not total to 100 per cent as some individuals gave more than one reason.
**This increase is due to the large number of former patients returning to the clinic for new conditions.
***Some individuals went to more than one clinic.

Table IX. — *Reason for Coming to Clinic, by Location of Cancer*

Rate per 100*

Location of Cancer	Physician		Social Worker		Nurse		Friends or Relatives		Clergy, Radio, Pamphlets		News-papers		Lectures		Past Experience or Former Patient		Dentist		Others	
	1932	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**	**1932**	**1933**
Buccal Cavity	67.6	64.9	1.4	4.6	2.8	1.2	10.6	9.2	2.1	0.0	10.6	12.7	0.0	0.0	2.8	15.5	0.0	0.6	2.1	2.3
Digestive Tract	75.2	75.2	3.3	3.8	0.8	1.9	6.6	6.7	0.0	0.0	5.8	6.7	0.0	0.0	7.4	11.4	0.0	0.0	1.7	2.9
Respiratory System	71.4	88.2	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	17.7	0.0	0.0	14.3	0.0
Uterus	70.6	85.6	2.7	2.4	4.0	0.8	5.3	3.2	0.0	0.0	6.7	3.2	0.0	0.0	6.7	23.2	0.0	0.0	4.0	2.4
Other Female Genital Organs	57.1	87.5	0.0	0.0	0.0	0.0	21.4	6.3	0.0	0.0	14.3	6.3	0.0	0.0	7.1	25.0	0.0	0.0	0.0	0.0
Breast	61.4	61.9	0.8	3.2	1.5	4.0	10.6	13.5	1.5	0.8	15.9	13.5	0.8	0.0	7.6	7.1	0.0	0.0	0.8	0.0
Male Genito-Urinary Organs	69.3	79.4	3.8	2.9	0.0	0.0	19.2	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	26.5	0.0	0.0	3.8	0.0
Skin	54.5	57.0	4.3	4.2	2.4	3.3	10.5	10.7	0.5	0.3	19.6	15.6	0.5	0.0	5.7	11.7	0.0	0.0	2.9	2.3
Other and Unspecified Organs	63.0	84.8	5.6	1.7	0.0	1.7	5.6	6.8	0.0	0.0	11.1	3.4	0.0	0.0	9.3	13.6	0.0	0.0	5.6	0.0
Hodgkin's Disease and Leukemia	61.1	84.2	0.0	5.3	0.0	0.0	11.1	10.5	5.6	0.0	0.0	0.0	0.0	0.0	22.2	15.8	0.0	0.0	0.0	0.0
Total Patients**	64.0	68.3	2.8	3.7	1.9	2.2	9.5	8.6	0.9	0.2	12.3	10.4	0.3	0.0	6.4	14.4	0.0	0.1	2.5	1.7

*Does not total to 100 per cent as some individuals gave more than one reason.

**Some individuals had more than one cancer.

TABLE X. — *Location of Cancer*

Rate per 100

LOCATION OF CANCER	1932	1933
Buccal Cavity	18.2	18.0
Digestive Tract	15.5	10.9
Respiratory System	0.9	1.8
Uterus	9.6	13.0
Other Female Genital Organs	1.8	1.7
Breast	17.0	13.1
Male Genito-Urinary Organs	3.3	3.5
Skin	26.8	32.0
Other and Unspecified Organs	6.9	6.1

TABLE XI. — *Diagnosis Established in Previous Years, Changed in 1933*

LOCATION OF CANCER	CHANGED TO CANCER	CHANGED FROM CANCER
Buccal Cavity	5	6
Digestive Tract	3	3
Respiratory System	2	0
Uterus	8	5
Other Female Genital Organs	1	0
Breast	8	2
Male Genito-Urinary Organs	0	1
Skin	10	1
Other and Unspecified Organs	5	2
Total	42	20

TABLE XII. — *Contact of Cancer Patients with Physician*

Rate per 100

	1933
Referred by physician:	
One physician consulted	39.2
More than one physician consulted	29.2
Not referred by physician:	
One or more physicians consulted	16.4
No physician consulted	15.2

TABLE XIII. — *Reason for Coming to Clinic, by Location of Cancer and Contact with Physician*

Rate per 100

LOCATION OF CANCER	1933					
	REFERRED BY PHYSICIAN			NOT REFERRED BY PHYSICIAN		
	One Physician Consulted	More Than One Physician Consulted	Total	One or More Physicians Consulted	No Physicians Consulted	Total
Buccal Cavity	17.2	17.3	17.2	17.6	22.9	20.0
Digestive Tract	11.6	13.2	12.0	15.0	2.1	8.5
Respiratory System	1.6	2.9	2.3	0.7	0.7	0.7
Uterus	14.2	19.9	16.2	9.2	2.8	5.9
Other Female Genital Organs	1.9	2.6	2.1	0.0	1.4	0.7
Breast	14.0	9.2	11.9	13.1	19.5	15.7
Male Genito-Urinary Organs	2.2	7.0	4.1	3.3	0.7	2.3
Skin	31.7	18.0	26.6	36.6	48.6	43.2
Other and Unspecified Organs	5.6	9.9	7.6	4.6	1.4	3.0

TABLE XIV. — *Contact of Cancer Patients with Physician, by Location of Cancer*

Rate per 100

LOCATION OF CANCER	NO PHYSICIAN		ONE PHYSICIAN		TWO OR MORE PHYSICIANS	
	1932	1933	1932	1933	1932	1933
Buccal Cavity	14.6	19.3	60.6	47.9	24.8	32.8
Digestive Tract	6.7	2.9	45.8	51.4	47.5	45.7
Respiratory System	0.0	6.3	66.7	37.5	33.3	56.2
Uterus	6.7	3.2	68.0	46.4	25.3	50.4
Other Female Genital Organs	21.4	12.5	35.7	43.7	42.9	43.7
Breast	24.4	22.4	51.2	54.4	24.4	23.2
Male Genito-Urinary Organs	19.2	3.0	50.0	30.3	30.8	66.7
Skin	27.1	23.9	53.6	55.3	19.3	20.8
Other and Unspecified Organs	13.0	3.5	40.7	38.6	46.3	57.9
Hodgkin's Disease and Leukemia	41.2	0.0	35.3	36.8	23.5	63.2
Total Patients*	18.2	15.1	52.4	49.5	29.4	35.4

*Some individuals had more than one cancer.

TABLE XV. — *Symptoms that First Brought Patient to Clinic, by Diagnosis*

Rate per 100*

SYMPTOMS	1933		
	Cancer	Precancerous Lesions	Total Patients
Swelling	35.6	30.2	37.5
Ulceration	34.0	17.0	15.8
Discharge and Bleeding	17.2	18.5	16.8
Pain	28.3	28.5	38.2
Deformity	7.5	24.3	10.3
Loss of Weight	11.3	4.4	10.5
Malaise	4.3	1.8	5.1
Observation	4.2	0.9	3.0
Itching	1.6	3.5	2.6
Scaly Skin	2.4	6.0	1.8
Others	10.0	7.3	11.1
Unknown	0.3	0.0	0.2

*Does not total to 100 per cent as multiple symptoms were given by some patients.

TABLE XVI. — *Type of Cancer, by Location of Cancer and Sex*

Rate per 100

LOCATION OF CANCER	Operable Cancer Probable Cure		Operable Cancer Possible Cure		Operable Cancer Palliative Measures Only		Inoperable Cancer	
	1932	1933	1932	1933	1932	1933	1932	1933
MALES								
Buccal Cavity	47.8	33.5	30.8	35.5	15.4	21.3	6.0	9.7
Digestive Tract	1.3	1.4	22.4	25.7	39.5	31.1	36.8	41.8
Respiratory System	16.7	0.0	0.0	23.1	33.3	69.2	50.0	7.7
Breast	0.0	0.0	50.0	100.0	0.0	0.0	50.0	0.0
Male Genito-Urinary Organs	13.6	18.8	22.7	18.8	40.9	31.2	22.7	31.2
Skin	71.8	72.8	22.6	25.7	3.2	1.0	2.4	0.5
Other and Unspecified Organs	17.2	19.1	34.5	14.3	24.1	47.6	24.1	19.1
Total Patients*	41.2	41.3	25.8	27.7	18.6	18.0	14.4	13.0
FEMALES								
Buccal Cavity	55.5	50.0	33.3	35.7	5.6	7.1	5.6	7.1
Digestive Tract	2.6	7.1	21.1	21.4	50.0	25.0	26.3	46.4
Respiratory System	0.0	0.0	0.0	0.0	0.0	50.0	0.0	50.0
Uterus	11.0	6.6	46.6	36.4	31.5	34.7	11.0	22.3
Other Female Genital Organs	15.4	15.4	46.1	30.8	30.8	23.1	7.7	30.8
Breast	19.2	23.1	40.8	49.6	20.8	12.4	19.2	14.9
Skin	75.0	76.8	19.8	14.3	2.6	6.3	2.6	2.7
Other and Unspecified Organs	31.6	25.0	31.6	16.7	21.0	25.0	15.8	33.3
Total Patients*	29.8	32.0	34.8	32.0	21.8	18.9	13.6	17.2

*Some individuals had more than one cancer.

TABLE XVII. — *Type of Cancer, by Individual Clinic and by Sex*

Rate per 100

Clinic	1933 MALES Operable Cancer Probable Cure	Operable Cancer Possible Cure	Operable Cancer Palliative Measures Only	In-operable Cancer	FEMALES Operable Cancer Probable Cure	Operable Cancer Possible Cure	Operable Cancer Palliative Measures Only	In-operable Cancer
Berkshire	0.0	100.0	0.0	0.0	100.0	0.0	0.0	0.0
Boston Dispensary	26.5	34.7	22.5	16.3	51.6	12.9	12.9	22.6
Brockton	60.0	14.3	14.3	11.4	56.7	20.0	3.3	20.0
Lawrence	47.8	39.1	13.1	0.0	54.6	36.4	4.5	4.5
Lowell	16.7	66.7	12.5	4.2	14.3	60.0	17.1	8.6
Lynn	58.3	19.4	16.7	5.6	41.7	38.9	11.1	8.3
New Bedford	52.0	16.0	8.0	24.0	4.3	47.8	30.4	17.4
Newton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pondville	38.9	23.3	23.0	14.8	29.7	26.9	21.0	22.4
Springfield	68.5	10.5	10.5	10.5	47.0	17.7	29.4	5.9
Worcester	28.0	52.0	12.0	8.0	16.2	37.8	29.7	16.2
Worcester North	42.8	50.0	0.0	7.1	20.0	40.0	40.0	0.0
Total Patients*	41.3	27.7	18.0	13.0	32.0	32.0	18.9	17.2

*Some individuals went to more than one clinic.

TABLE XVIII. — *Diagnosis**

Rate per 100

DIAGNOSIS	1932	1933
Cancer primary	15.7	16.0
Cancer with metastases	3.9	4.6
Cancer recurrent following operation	2.1	2.8
Original Diagnosis non-cancer changed to cancer	0.7	0.6
Cancer recurrent, formerly post-operative cancer	0.1	0.1
Precancerous lesions changed to cancer	0.2	0.5
Diagnosed cancer at death	0.1	0.1
Original diagnosis no recurrence, diagnosed recurrent cancer of same site at death	0.0	0.1
Original diagnosis non-cancer, diagnosed cancer of same site at death	0.0	0.03
Hodgkin's Disease and Leukemia	0.5	0.5
Post-operative cancer, no evidence of recurrence	1.5	2.8
Benign tumors	16.3	16.5
Precancerous lesions	9.6	12.8
Original diagnosis cancer, changed to non-cancer	0.7	1.1
Original diagnosis cancer recurrent, changed to post-operative cancer	0.0	0.03
Original diagnosis Hodgkin's Disease, changed to non-cancer	0.0	0.1
Diseases of the digestive system	8.9	9.2
Diseases of the circulatory system	1.2	1.8
Diseases of the genito-urinary system	6.4	6.4
Diseases of the respiratory system	0.7	0.5
Diseases of the nervous system	1.0	1.0
Diseases of the skin	7.1	5.5
Mouth lesions	1.8	1.7
Diseases of the bones	0.2	0.7
Diseases of the eye and ear	0.2	0.3
Tuberculosis	0.7	0.5
Diabetes	0.1	0.03
Pernicious anemia	0.1	0.2
Rheumatism	0.3	0.7
Goitre	0.3	0.2
Syphilis	0.3	0.4
Apoplexy	0.0	0.03
Undiagnosed	0.8	0.7
Deferred	3.3	2.9
No pathology	4.9	4.4
Non-cancer, diagnosis not established	0.9	0.4
All others	9.7	6.3

*Does not total to 100 per cent as some individuals had more than one diagnosis.

Table XIX.—*Tumor Diagnosis Service, 1933*

Specimens were received from hospitals listed below:

Acushnet Sanitarium and Hospital, New Bedford
Animal Hospital, Reading
Audubon Hospital, Boston
Ayer Memorial Hospital, Ayer

Baptist Hospital, Boston
Barr Sanitorium, Lawrence
Bay State Hospital, Boston
Belchertown State School, Belchertown
Benson Hospital, Haverhill
Bridgewater State Hospital, State Farm
Brockton Hospital, Brockton
Burbank Hospital, Fitchburg

Cable Hospital, Ipswich
Cape Cod Hospital, Hyannis
Central Hospital, Somerville
Central Maternity Hospital, Haverhill
Chelmsford Street Hospital, Lowell
Clinton Hospital, Clinton
Clover Hill Hospital, Lawrence
Codman Square Hospital, Dorchester
Cohasset Hospital, Cohasset
Commonwealth Avenue Hospital, Boston
Crary Clinic Hospital, New Bedford

Dover Street Clinic, Boston
Ducy Hospital, Brockton

Evangeline Booth Hospital, Boston

Fairlawn Hospital, Worcester
Fairview Hospital, Great Barrington
Farren Memorial Hospital, Montague City
Faulkner Hospital, Jamaica Plain
Fernald State School, Waverly
Forest Hills Hospital, Jamaica Plain

Gale Hospital, Haverhill
Gardner State Colony, Gardner
Glynn Hospital, Dorchester
Harley Hospital, Boston
Haverhill Municipal Hospital, Haverhill
Henry Heywood Memorial Hospital, Gardner
Hillcrest Hospital, Pittsfield
Holden District Hospital, Holden
Holyoke Hospital, Holyoke
Homberg Infirmary, M. I. T., Cambridge
House of Mercy, Pittsfield

Jordan Hospital, Plymouth

TABLE XIX.—*Tumor Diagnosis Service, 1933*—Continued

Lawrence City Hospital, Lawrence
Lawrence General Hospital, Lawrence
Leominster Hospital, Leominster
Lowell General Hospital, Lowell
Ludlow Hospital, Ludlow
Lynn Hospital, Lynn

MacLeod Hospital, Boston
Martha's Vineyard Hospital, Oak Bluffs
Mary A. Alley Hospital, Marblehead
Mary Lane Hospital, Ware
Massachusetts Osteopathic Hospital, Jamaica Plain
Memorial Clinic, Inc., Holyoke
Mercy Hospital, Springfield
Middlesex Hospital, Cambridge
Milford Hospital, Milford
Millers River Hospital, Winchendon
Milton Hospital, Milton
Moore Hospital, Brockton
Morton Hospital, Taunton
Mount Hope Hospital, Dighton
Murdock Hospital, Brockton

Nantucket Cottage Hospital, Nantucket
New England Sanitarium, Melrose
Noble Hospital, Westfield
Norfolk Medical Center, Stoughton
Norwood Hospital, Norwood

Providence Hospital, Holyoke

Quincy City Hospital, Quincy

Roxbury Hospital, Roxbury

St. John's Hospital, Lowell
St. Joseph's Hospital, Lowell
St. Luke's Hospital, Middleborough
St. Vincent Hospital, Worcester
Soldiers' Home Hospital, Chelsea
Somerville Hospital, Somerville
Springfield Hospital, Springfield
State Infirmary, Tewksbury
Sturdy Memorial Hospital, Attleboro
Sunnyside Hospital, Somerville

Trumbull Hospital, Brookline
Union Hospital, Fall River
Union Hospital, Lynn
Union Hospital, New Bedford
United States Naval Hospital, Chelsea

Webster District Hospital, Webster
Wesson Memorial Hospital, Springfield
Weymouth Hospital, Weymouth
Winchester Hospital, Winchester
Worcester City Hospital, Worcester
Memorial Hospital, Worcester

REPORT OF DIVISION OF BIOLOGIC LABORATORIES

Elliott S. Robinson, Ph.D., *Director*
Roy F. Feemster, M.D., *Assistant Director*

Inasmuch as the year 1933 is the last of Dr. Benjamin White's term of over thirteen years as Director of this Division, the annual report may fittingly be prefaced by a summary of the Division's progress under his leadership.

Doctor White's first efforts were directed to improving the quality of the biologic products then being distributed. This involved the addition of new equipment as well as alterations in the techniques followed. Some of these changes also resulted in economies, as for example an increased yield of diphtheria antitoxin from individual horses and of vaccine virus per calf. Methods of testing and packaging were also modified when necessary to conform to those approved by the National Institute of Health.

The space available at the Antitoxin and Vaccine Laboratory was too limited to provide for the most satisfactory working conditions. Various expedients were considered, but the most satisfactory one was finally carried out when additions were made to both the laboratory and stable buildings in 1927.

There has been a large increase both in the number of different products made as well as in the quantities distributed. In 1920, the products distributed were diphtheria antitoxin, antimeningococcic and antipneumococcic serum, smallpox vaccine virus, typhoid-paratyphoid vaccine and small amounts of Schick test material and diphtheria toxin-antitoxin mixture. In the following years these products have been distributed in much larger volume and in addition scarlet fever streptococcus antitoxin, diphtheria toxoid, tuberculin and convalescent serums have been added to the list of prophylactic and therapeutic agents, as well as diagnostic agglutinating serums. The manufacture of silver nitrate solution ampoules, originally carried out by the Division of Food and Drugs, was transferred to the Antitoxin and Vaccine Laboratory; and in 1930 distribution of all biologic and arsenical products to boards of health and physicians was also removed to that laboratory from the State House. The large increase in volume of business has necessarily enlarged the amount of record-keeping involved; but this has been kept down by the use of printed forms, most of which have been especially designed for our purposes for no stock forms are available.

Along with the routine work of the laboratory, a large amount of investigation has been carried along. Some of the results obtained have been incorporated in our routine procedures. For titles of the thirty-six papers published, reference should be made to this and preceding annual reports.

The Wassermann Laboratory has shown a similar increase in volume of services rendered, during these same years. The total number of tests has increased more than four-fold since 1920. The variety of services offered has been augmented by the performance in certain instances of Kahn and Hinton tests for the diagnosis of syphilis and, for the Division of Animal Industry, of agglutination tests for Brucella abortus.

Outside the laboratory Doctor White's efforts were devoted first to the diphtheria immunization campaign, in which he spent much time in lecturing and giving demonstrations of immunization procedures in many parts of the State. He was also keenly interested in the use of antipneumococcic serum and was largely responsible for planning the study now in progress under a grant from the Commonwealth Fund of New York.

Doctor White's enthusiasm for public health education was expressed both through formal courses for physicians, public health students and students of bacteriology and laboratory technic, and by short sessions enabling medical students and nurses to go through the laboratory to see such processes as were susceptible of demonstration. Many other visitors have also availed themselves of the opportunities he made for them.

I. ANTITOXIN AND VACCINE LABORATORY

1. Distribution of Products

	1929	1930	1931	1932	1933
Diphtheria Antitoxin, 1,000 unit doses	315,441	264,378	212,601	195,648	164,587
Antimeningococcic Serum, 15 cc. doses	4,413	5,433	3,577	3,530	2,960
Antimeningococcic Serum, 15 cc. doses (Conc.)	18	158	115	–	–
Antimeningococcic Serum, bulk cc.	–	7,200	–	–	–
Antipneumococcic Serum, 100 cc. doses	80	1	–	–	–
Antipneumococcic Serum, Conc. 15 cc. doses	691	1,253	1,392	2,591	2,849
Antipneumococcic Serum, Lederle	–	–	–	18	108
Smallpox Vaccine Virus, capillary tubes	422,115	325,427	290,824	350,727	274,957
Typhoid-Paratyphoid Vaccine, 1 cc. doses	85,681	93,788	94,635	88,908	89,297
Schick Outfits, 50 doses each	6,428	8,481	8,503	7,748	7,100
Diphtheria Toxin (Bulk) cc.	785	1,000	175	265	10
Diphtheria Toxin-Antitoxin Mixture, 1 cc. doses	357,944	419,347	474,881	420,003	461,930
Diphtheria Toxoid (Bulk) cc.	–	–	3,600	1,100	–
Diphtheria Toxoid 1 cc. doses	–	–	–	1,557	22,002
Scarlet Fever Streptococcus Antitoxin, doses	4,964	4,841	3,433	–	2,207
Scarlet Fever Streptococcus Toxin, 5 cc. vials	–	–	–	–	128
Scarlet Fever Streptococcus Toxoid—1st dose	–	–	–	–	66
" " " " —2nd dose	–	–	–	–	54
" " " " —3rd dose	–	–	–	–	54
" " " " —(Bulk) cc.	–	–	–	–	207
Normal Serum, cc.	647,365	175,970	51,375	31,395	20,865
Silver Nitrate Solution (ampoules)	59,692	52,215	64,423	61,586	60,399
Anti-Measles-Diplococcus Serum, vials	24	3	447	–	–
Influenza Serum, vials	32	245	481	573	757
Tuberculin (ampoules)	–	39	734	1,925	2,362
(bulk) cc.	–	–	100	550	–
Sodium Citrate, vials	–	–	1,563	896	1,230
Convalescent Serum—Poliomyelitis, vials	–	–	–	714	951
" " —Scarlet Fever, vials	–	–	–	–	231
" " —Normal Human, vials	–	–	–	–	22
Typhus Serum, 20 cc. vials	–	–	–	40	20
" " (bulk) cc.	–	–	–	–	100
Diagnostic Serum, cc. Pneumococcus I—horse	–	135	415	1,015	1,270
" " " " II—horse	–	85	290	975	1,205
" " " " III—horse	–	80	255	1,080	1,325
" " " " V—horse	–	–	–	325	300
" " " " I—rabbit	–	–	–	–	57
" " " " II—rabbit	–	–	–	–	57
" " " " III—rabbit	–	–	–	–	57
" " " Typhoid	–	8	10	26	22
" " " Paratyphoid A	–	5	15	32.5	25
" " " Paratyphoid B	–	2.5	20	35	25
Arsphenamine 0.5 gram (ampoules)	–	500	150	10	339
" 0.4 " "	–	273	384	590	202
" 0.6 " "	–	490	903	1,520	1,602
" 2.0 " "	–	100	25	–	–
" 3.0 " "	–	1,500	2,815	2,510	2,280
Sulpharsphenamine, 0.3 gram (ampoules)	–	1,502	3,552	1,676	2,045
" 0.4 " "	–	1,504	1,688	1,526	1,282
" 0.6 " "	–	4,269	11,575	7,033	4,655
" 1.0 " "	–	743	1,591	1,108	200
" 3.0 " "	–	455	1,253	661	268
Neoarsphenamine, 0.45 gram (ampoules)	–	4,419	10,228	8,606	12,320
" 0.6 " "	–	11,887	23,929	26,099	32,050
" 0.9 " "	–	3,303	8,649	9,203	13,880

(*a*) *Diphtheria Antitoxin.*—The decrease in the incidence of diphtheria has resulted in a much lessened demand for antitoxin, distribution having decreased approximately fifty per cent in the past five years.

(*b*) *Antipneumococcic Serum.* A moderately increased distribution for 1933 is due to the continuation of the Pneumonia Study. Undoubtedly a larger volume will be distributed as more areas are added and as the disease resumes its usual prevalence.

(*c*) *Smallpox Vaccine Virus.*—Not since 1925 has such a small number of doses been sent out.

(*d*) *Diphtheria Toxin-Antitoxin Mixture.*—The demand for diphtheria toxin-antitoxin mixture continues large and in fact the month of October showed a distribution larger than for any previous single month. It is to be expected that the distribution of this product will decrease as diphtheria toxoid becomes more popular.

(*e*) *Diphtheria Toxoid.*—This has been largely distributed in single dose packages and it is only recently that the product has been used in the larger clinics. There has been no complaint of reactions caused by toxoid and it seems probable that it will become increasingly popular. The limitation of its use to children under the age of seven might be lifted for it would appear safe to use in children somewhat older than that.

(*f*) *Scarlet Fever Streptococcus Antitoxin.*—Distribution of this product was again begun in January, after a lapse of about a year and a half. The demand for it has been much less than in previous years, either because physicians were unaware that we were again distributing this product or quite probably because it is not as generally used as it was a few years ago.

(*g*) *Scarlet Fever Streptococcus Toxin and Toxoid.* These products are not available for general distribution but have been used in our study of the immunizing value of the toxoid.

(*h*) *Tuberculin.*—There has been an increase of about twenty per cent in the distribution of this product during the past year.

(*i*) *Human Convalescent Serum.*—In addition to convalescent serum for poliomyelitis we have also undertaken the manufacture of convalescent serum from scarlet fever patients. This has been done for those boards of health which have arranged for donors. The serum has been returned to these boards for their use in immunization of contacts. This appears to have been successful in reducing the incidence of scarlet fever.

(*j*) *Diagnostic Serum.*—In addition to the agglutinating serums previously produced, production has also been started of a serum produced by the immunization of rabbits against pneumococci of Types I, II or III. Such rabbit serums are necessary in performing the Neufeld test for typing pneumococci found in sputum.

2. *Expenses*

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1929 . . .	$63,400 00	$63,392 26	$39,560 48	$39,261 97	$102,960 48	$102,654 23
1930 . . .	67,700 00	67,698 66	42,412 45	42,243 09	110,112 45	109,941 75
1931 . . .	71,000 00	70,984 35	42,556 90	42,504 57	113,556 90	113,488 92
1932 . . .	71,500 00	71,481 70	37,314 70	35,528 06	108,814 70	107,009 76
1933 . . .	66,860 00	65,699 94	34,768 41	31,945 31	101,628 41	97,645 25

The amount expended has been appreciably below the amount appropriated because of the lower distribution and also because prices have continued unusually low. It seems certain that this condition will not continue, for prices, particularly for forage, have already shown an increase. Thanks to the lessened expenditures it has been possible to take care of certain large repairs which arose unexpectedly.

3. *Improvements*

There has been no demand for expensive pieces of equipment, but the usual policy of maintaining the buildings in good condition has been continued.

4. *Personnel*

There has been no change in the number of persons employed ,but the resignation of Doctor White necessitated filling that position which was done by the promotion of the Assistant Director. Dr. Roy F. Feemster has been appointed Assistant Director.

5. *Education*

The demonstrations for medical and public health students and public health nurses were attended by 532. The course in Applied Immunology, given in connection with the Harvard School of Public Health was held in the latter part of March and April. Three students of the Simmons College course in Public Health Laboratory Methods were also given instruction.

6. *Lectures and Addresses*

The Assistant Director gave lectures and demonstrations in the course on Immunity at the Harvard Medical School and in the courses for graduates of the same school. The laboratory has had many visitors from various parts of this country and from Australia, China, Hungary, India, Russia and Siam.

7. *Investigations*

(*a*) This laboratory has undertaken the preparation of scarlet fever streptococcus toxoid for use in a study of this product by the Division of Communicable Diseases. The study has been under way too short a time to give evidence of its outcome.

(*b*) Preliminary studies have been undertaken on the preparation of alum diphtheria toxoid. This investigation is also at too early a stage to indicate its probable outcome, but in view of the interest in this product and its use elsewhere, it seems reasonable to believe that a satisfactory product can be eventually prepared.

(*c*) The pneumonia study has been continued. A good deal of effort has been devoted to studying the more recently suggested methods of testing the potency of antipneumococcic serum. Further work has also been done on the test for determining chill reaction substances by the use of monkeys.

8. *Publications*

1. Barnes, L. A., and Kramer, S. D.: A test for reaction-producing substances in concentrated antipneumoccocic serum. Preliminary Report. Am. Jour. Pub. H., XXIII, 6, June, 1933, p. 616.
2. East, E. M. and White, Benjamin: The reactions of Halicystis and of Valonia to injections of certain proteins. Jour. Gen. Physiology, XVI, 6, July 20, 1933, p. 937.

9. *Inspection*

Dr. George W. McCoy, Director of the National Institute of Health of the United States Public Health Service made his annual inspection of this laboratory on July 10. As a result the United States Treasury Department license to manufacture and sell the present list of biologic products was continued.

II. WASSERMANN LABORATORY

WILLIAM A. HINTON, M.D., *Chief of Laboratory*

I. *Tests and Examinations*

	1929	1930	1931	1932	1933
Wassermann Tests	81,743	89,864	97,444	100,948	106,211
Kahn Tests	3,594	3,822	12,735	15,059	18,541
Hinton Tests	–	13,060	15,412	22,167	30,371
Modified Hinton Tests	–	12,025	–	–	–
Gonococcus Fixation Tests	2,498	2,790	2,560	3,195	3,657
Lange's Colloidal Gold Tests	89	50	79	107	106
Complement Fixation Tests for Glanders	23	30	32	27	74
Specimens of Milk Examined for Tuberculosis	–	–	1	–	–
Agglutination Tests for Bacillus Abortus	–	-	–	258	-
Diagnostic Examinations for the Division of Animal Industry:					
(*a*) Complement Fixation Tests for Glanders	116	78	13	5	11
(*b*) Examinations for Rabies	458	460	515	265	301
(*c*) Pathologic and Bacteriologic Examinations	24	35	32	22	21
(*d*) Agglutination Tests for Bacillus Abortus	4,383	8,643	8,966	10,077	11,921
(*e*) Specimens of Milk Examined for Tuberculosis	–	52	–	–	–
	92,928	130,909	137,789	152,130	171,214

The total number of tests again shows an increase of over ten per cent over the number done last year. The average cost per test has in consequence dropped again so that it is now only 12.3 cents per test.

2. *Expenses*

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1929	$15,800 00	$15,328 92	$5,300 00	$5,297 13	$21,100 00	$20,626 05
1930	16,500 00	15,935 42	5,704 75	5,688 54	22,204 75	21,623 96
1931	16,600 00	16,591 76	5,213 34	5,213 34	21,813 34	21,805 10
1932	17,000 00	16,409 86	5,200 80	5,144 12	22,200 80	21,553 98
1933	15.990 00	15,654 38	5,000 00	4.916 28	20,990 00	20,570 66

The expenses for 1933 were reduced somewhat in comparison with the previous year, due to reductions in salaries. The increasing amount of work will soon necessitate either an expansion in the laboratory personnel or a reduction in the number or nature of services performed for it is unreasonable to expect that the volume of work done can be appreciably increased without additional personnel. It is indeed remarkable that the Wassermann Laboratory has been able to function so efficiently in view of the constant increase in the number of tests.

In addition to the routine activities, the Wassermann Laboratory has furnished instruction to men in the second year class of the Harvard Medical School; to a special class of fifteen senior students from Simmons College; to three special students in the graduate department of Simmons College; and to one man from the School of Public Health of Harvard University.

REPORT OF DIVISION OF CHILD HYGIENE

M. Luise Diez, M.D., *Director*

The following report outlines the chief activities of the Division of Child Hygiene for the year ending December 31, 1933.

I. Activities of the Various Sections:

1. *Maternal, Infant and Preschool Hygiene:*
    - (*a*) Maternity Service
    - (*b*) Advisory Committee on Obstetrics
    - (*c*) Mothers' Classes
    - (*d*) Well Child Conferences
    - (*e*) Summer Round-Up
2. *School Hygiene:*
    - (*a*) Surveys
    - (*b*) School Hygiene Conferences
    - (*c*) Superintendents' Clubs
    - (*d*) High School Health Councils
    - (*e*) Hyannis State Teachers' College
    - (*f*) Fitchburg State Teachers' College
    - (*g*) Health Education Courses for Teachers
3. *Public Health Nursing:*
    - (*a*) Hospital Training Schools
    - (*b*) Tuberculosis Nursing
    - (*c*) Communicable Disease Nursing
    - (*d*) School Nursing
    - (*e*) University Extension Courses
    - (*f*) Continuation Courses
    - (*g*) Nursing Standards
    - (*h*) Nursing Club Activities
    - (*i*) Advisory Committee on Public Health Nursing
    - (*j*) Scholarships for Nurses
    - (*k*) General Nursing Service
4. *Nutrition:*
    - (*a*) Emergency Nutrition
    - (*b*) Community Work
    - (*c*) Public Welfare Food Plans
    - (*d*) Summer Camps
    - (*e*) Chadwick Clinics
    - (*f*) Local Chest Clinics
    - (*g*) State Teachers' Colleges
    - (*h*) Unusual Work with Grocers
    - (*i*) School Lunch
    - (*j*) Dental-Nutrition Studies
    - (*k*) Advisory Committee on Nutrition
    - (*l*) Advisory and Consultant Service
    - (*m*) General
5. *Dental Hygiene:*
    - (*a*) Consultant in Dentistry
    - (*b*) Dental-Nutrition Studies
    - (*c*) School Dental Clinics
    - (*d*) Surveys
    - (*e*) Periodontal Disease

I. Activities of the Various Sections:—*Continued*
Dental Hygiene—continued

(*f*) Dental Publications and the Private Dentist
(*g*) Southern Berkshire Health District
(*h*) Visits to Dentists
(*i*) Annual Dental Reports
(*j*) Dental Certificates
(*k*) Dental Care and the Preschool Child
(*l*) School Dental Association
(*m*) Dental Hygiene Council
(*n*) Massachusetts Dental Society
(*o*) Dental Advisory Committee

6. *Health Education:*
(*a*) Publicity
(*b*) Health Education
(*c*) Pamphlets, Posters, Exhibits
(*d*) Library
(*e*) Lectures, Motion Pictures
(*f*) Prenatal and Postnatal Letters and Fathers' Letter

II. Special Projects:
1. May Day — Child Health Day
2. 4-H Clubs
3. Franklin County Study
4. Institute on Child Health
5. Staff Education
6. New Services Established

III. Personnel of the Division.

I. Activities of the Various Sections

1. Maternal, Infant and Preschool Hygiene:

(*a*) *Maternity Service.*

At the close of the calendar year there were on the register for the monthly prenatal letters, letter to fathers, and postnatal letters covering the baby's first two years, approximately 23,000 names, as compared with 21,900 registered during the previous year.

(*b*) *Advisory Committee on Obstetrics.*

A notable advance in the field of maternity care was the preparation and printing of a pamphlet outlining Community and Nursing Standards for Maternity Care. This was accomplished by the Obstetrical Section of the Massachusetts Medical Society, through the Advisory Committee on Obstetrics appointed in 1932, to confer with the Department on such matters. These standards were distributed to physicians, nurses and nursing organizations, maternity hospitals and social agencies throughout the State, and have been highly commended.

(*c*) *Mothers' Classes.*

The Mothers' Classes organized by the Division staff have been taken over by a number of the local communities as part of their community program, in one instance under the direction of the Red Cross Home Hygiene instructor. The material was completed for Classes for Mothers of Preschool Children.

(*d*) *Well Child Conferences.*

In Franklin County we are still continuing to give service to several of the communities that were included in our five-year demonstration Well Child Conferences. During 1933, twelve towns in Franklin County were thus served, and 341 children examined. The consultant nurse for that district reports that this activity is one of outstanding importance and the general feeling is that much has been accomplished. In 1932 four towns in the County conducted their own conferences, due mainly to the activity of an unusually fine nurse who covered these towns, and who secured the cooperation of the local town officials, physicians and local committees. In 1933 five towns conducted their own conferences. Another town in the district carried on its own Well Child Conference under the auspices of the Parent-Teacher Association, in 1933. Out of the twenty-five rural towns in Franklin County, seven (28 per cent) were interested enough to carry on their own Well Child Conferences as a result of the demonstration carried on by the Department for a five-year period. Nine towns had no conferences during 1933.

Outside Franklin County there were 19 communities in which the Department Well Child Conferences were held, and 1,375 children were examined by the conference staff. These included five towns in Hampshire County, two of which had never had the demonstration conferences before — Westhampton and Northampton.

This year saw the beginning of a three-year demonstration in Northampton, sponsored by the Parent-Teacher Association. A great deal of community interest was secured from professional and lay persons and splendid cooperation afforded the Conference staff by the newspapers, and health and lay groups in the community. An excellent local committee was formed which did fine work. The pediatrician of the Division visited sixteen of the local physicians and the consensus of medical opinion was that this project was a good one, particularly at this time.

The Well Child Conference held in Hinsdale reached out to the two towns of Washington and Peru which were never covered before with such service. This plan was proposed by the superintendent of schools covering these towns, who is particularly interested in public health and child welfare.

Other communities having the conference for the first time were Lakeville, Somerset, Williamsburg and Wayland. In each town much interest was evident and it is hoped that the follow-up of those children needing correction of defects may be as satisfactory.

In Wayland a monthly Well Child Conference was established, the purpose being to carry it on for a period of a year and then survey the results. This is a town of about 2,900 population, with three resident physicians. Thus far seven monthly conferences have been held and 137 examinations made, and the community is keenly interested in this project.

Again this year we held a Conference at the Massachusetts Reformatory for Women at Framingham. Many improvements were noted in the group of babies examined there, but there is still much to be accomplished if preventive work is to be successful.

Statistics for these two Conferences are as follows:

Wayland — Well Child Conferences held during 1933	7
Number of examinations made	137
Number of children examined	89
Number of repeats	23
Number entering school	27
Framingham Reformatory — Conferences held during 1933	2
Number of examinations made	120
Number of repeats	37
Number of children examined	83

Increased interest has been manifested in the islands of Martha's Vineyard, Nantucket and Cuttyhunk, where the Conference Unit has carried on conferences in recent years. In Nantucket this year's was the third annual conference to be held. The consultant nurse for the district assisted in the plans for follow-up of those children found to have defects needing correction; also for a dental-nutrition program, social hygiene service, school health record-keeping, daily and monthly report of school nurse, and a toxin-antitoxin campaign. The fifth conference was held in Martha's Vineyard, following which a conference was held with Red Cross workers and local people for the furtherance of a generalized public health nursing program for the Island. Cuttyhunk had its third conference this year, and the examinations included the school children as well as the preschool children. Here a

"Health Night" was planned and for the first time moving pictures, on health subjects, were shown on the Island, much to the delight and interest of those attending.

Throughout the year the Conference Unit of the Division held Well Child Conferences in 32 towns, and a total of 1,801 examinations was made. It was the general impression of those making these examinations that of the children examined during 1933 a smaller number could be classed as showing good nutrition.

Statistics for Well Child Conferences During 1933

Number of Children Examined	School	Preschool	Entering School
1,716	15	1,152	549
Number with defects	14	939	518
Number without defects	1	213	31
Total defects found	32	2,268	1,759
Total number of examinations made during 1933		1,801	
Total number of children examined during 1933		1,716	

(*e*) *Summer Round-Up.*

Summer Round-Up this year was very poorly reported by communities. Only 91 towns reported and of these, 17 reported having no Summer Round-Up. In the towns reporting Summer Round-Up there were 1,711 children without defects, of the 5,214 examined. There were 2,143 with defects and only about 50 per cent (1,033) of these had defects corrected. The outstanding defects were teeth, throat, nose, glands, posture and nutrition. In these 5,214 children examined there were 6,063 defects and 2,585 were corrected. Since many of the reports were incomplete and in some cases misunderstood, these figures are only approximate.

2. School Hygiene:

(*a*) *Surveys.*

The usual school hygiene survey was carried on by the pediatrician and public health nursing consultant in one community during the year, and recommendations for improvement in the service sent to the local school authorities.

(*b*) *School Hygiene Conferences.*

Feeling that the school hygiene conferences, as such, had served their purpose for the past ten years, we sought to confer with the school people in different and more intimate ways, hoping thereby to lessen the number of meetings to which they were obligated each year. An example of this was the conference held at East Bridgewater where we were asked by the Superintendent of Schools, who is also President of the County Teachers' Association, to conduct a health meeting for nurses at the same time that the Teachers' Convention was held. The nurses were required by their superintendents to attend this meeting, and considerable interest was evinced in this method of reaching them.

(*c*) *Superintendents' Clubs.*

One of the most satisfactory achievements of the year has been the response from the superintendents of schools as they have met in their clubs during the fall. During the year the Superintendents' Clubs in the Boston district, Worcester, North Adams and Greenfield were reached, and the subject discussed was a particular health subject requested by the club concerned. The unusual earnestness of the superintendents and their keen interest in school health programs was noted in every instance.

(*d*) *High School Health Councils.*

An outstanding activity is the interest in High School Health Council organization. In Northfield and South Hadley the Public Health Education Worker of the Division started such councils. In South Hadley a demonstration was given of the use of the audiometer in testing hearing, including the faculty and student council members, which resulted in the detection of several cases of seriously impaired hearing. Medical examination and treatment were given to those thus found and plans made for follow-up testing of the hearing early in the coming year. Vision testing given to the same groups resulted in the discovery of defective vision in a number of the students, three of which were very serious, and correction was obtained, much to the satisfaction of the pupils and teachers.

The Student Health Councils are functioning in Manchester, Andover, Chelmsford and Wrentham, where improved health education was noted. A new Health Council was established in Northfield during the year.

(e) *Hyannis State Teachers' College.*

The Division of Child Hygiene cooperated again with the State Department of Education in conducting courses at Hyannis State Teachers' College, for nurses and teachers. Nine teachers and fourteen nurses attended these courses, which were conducted by a Pediatrician, a Public Health Nursing Consultant, and the Consultant in Nutrition of the Department, the latter giving a short nine-hour course on Normal Nutrition to the nurses. It was felt that a longer course would better meet the needs of these nurses.

The time has come when the field of teachers, sufficiently interested to take extra work in health education, is becoming exhausted, as the newer teachers having college training have had some background in this subject. State-wide plans for staff education will be made later and it seemed logical to discontinue the work as it has been carried on at Hyannis.

(f) *Fitchburg State Teachers' College.*

At the request of the State Department of Education a new course was conducted this summer at Fitchburg State Teachers' College, for the benefit of home economics teachers, the subject covering Nutrition from a Health Viewpoint. This group represented high school teachers and came from fourteen cities.

Another course given at Fitchburg State Teachers' College was one for home economics teachers and Red Cross nurses, given by another nutritionist of the Division, on the subject, Nutrition and the Methods of Presenting it Effectively. This course was given to 25 students from ten different cities in the State.

(g) *Health Education Courses for Teachers.*

Health education courses for teachers were carried on in fifteen towns, in four of which separate meetings were held for the high school teachers. In all, eighty-eight meetings were held for thirty-seven different groups. These courses with individual lectures on health education, reached 627 teachers during the year.

3. Public Health Nursing:

We are pleased to announce the appointment of the Chief Consultant in Public Health Nursing, mention of whom is made elsewhere in this report.

It has been found that the generalized plan for the consultant nurses of the Division has been successful and much has been accomplished during the year.

(a) *Hospital Training Schools.*

The public health nursing consultants have continued to give courses in Public Health to student nurses at hospital training schools. During 1933 courses were conducted in Waltham (Middlesex County Tuberculosis Sanatorium), Medford, Chelsea, Peabody, North Adams, Greenfield, Montague, Northampton, Pittsfield (3 hospitals), Springfield, Milford, Worcester (4 hospitals), Westborough, Rutland (State Sanatorium), Gardner, Leominster, Fitchburg, Clinton and Boston (Long Island Hospital). Usually ten lectures are given in each course and special lecturers are secured on Mental Hygiene, Nutrition, Social Hygiene, Syphilis and Gonorrhea, and Publicity. Several of the training schools have made these courses a part of their regular curriculum. A total of 448 nurses in training were reached in this manner.

(b) *Tuberculosis Nursing.*

A special plan was worked out for home visiting by the consultant nurses, in cooperation with Dr. Sumner Remick, Superintendent of the Middlesex County Sanatorium for Tuberculosis. This was for the purpose of contacting persons who were on the waiting list to this particular Sanatorium.

The Chadwick Clinic was held in the town of Needham for the first time this year. Follow-up of those examined by the clinic and found to require it, will be done by the board of health of the town.

In Fairhaven a very satisfactory piece of work was accomplished when the local visiting nursing association decided to take over the tuberculosis nursing for the town.

It is regrettable that because of lack of sufficient funds the tuberculosis nursing in Braintree and North Attleboro had to be discontinued.

(c) *Communicable Disease Nursing.*

In addition to cooperating in the tuberculosis nursing, the consultant nurses of the Division rendered assistance in communicable disease nursing in various communities, particularly with regard to toxin-antitoxin programs. In Weymouth and Randolph excellent diphtheria immunization campaigns were carried on. In Weymouth a high percentage of the preschool children were immunized (about 34 per cent) and about 65 per cent of the school population. In Randolph 86 per cent of the child population were immunized. In Abington, for the first time, preschool children were included for immunization when the school children were being immunized. Of the 350 preschool children, about 112 completed the three treatments required for immunization.

(d) *School Nursing.*

The Daily and Monthly Report form for the use of school nurses is being widely used throughout the State. In the district included in the Nashoba Associated Boards of Health all the towns are using this report for their school nursing records.

In Somerset a full-time nurse replaced a part-time nurse. In Reading it became necessary to discontinue the services of one school nurse due to lack of funds.

(e) *University Extension Courses.*

The University Extension Courses in Boston and Greenfield were completed this year; total pupils in attendance, 15.

(f) *Continuation Courses.*

The Continuation Courses were completed in Boston, Springfield and Holyoke, 66 pupils attending. These courses included special lectures on Sex Education, Syphilis and Gonorrhea, and Social Hygiene Problems.

(g) *Nursing Standards.*

A distinct advance in nursing standards was effected by the action of the Obstetrical Section of the Massachusetts Medical Society, in issuing Community and Nursing Standards for Maternity Care, mentioned earlier in this report.

(h) *Nursing Club Activities.*

The Public Health Workers' Clubs, mainly members of the nursing profession, continued their activities as usual and two new clubs were formed during the year, one in Bristol County and another in the western section of Norfolk County. In the Cape Cod district the program included a joint luncheon meeting with official and unofficial groups, as well as a joint meeting with a Teachers' Club.

(i) *Advisory Committee on Public Health Nursing.*

The Advisory Committee on Public Health Nursing rendered valuable assistance on several occasions during the year when they were called upon to consider nursing policies and program of the Department, and more recently the proposed nursing program under Federal Emergency Relief Administration, if funds were available.

(j) *Scholarships for Nurses.*

Through the Commonwealth Fund the public health nurse for Harwich secured a scholarship at East Harlem Nursing and Health Center for four months.

(k) *General Nursing Service.*

Increased service under the generalized nursing program was noted in Wellesley, where joint service was arranged between the board of health and the visiting nursing association. In Dedham an additional child welfare nurse was added to the staff of the Dedham Emergency Association. In Holyoke, under the visiting nursing association delivery service is now being shared by the general staff and the nurse formerly doing only maternity nursing is serving on a generalized nursing plan.

In the Nashoba Health District, because of the resignation of the Advisory Nurse, Miss Seeley, the work was taken over by the consultant nurse for that district until November first, when the vacancy was filled by the appointment of Miss Dorothy Northrup, former staff nurse in the Southern Berkshire Health District.

In the Nashoba District also plans were made for a social worker from the Department to spend a half day there monthly and appointments made for the nurses in the various towns within the district for consultations on social problems.

Curtailment of nursing service has been noted in several places because of lack of funds to continue the work. In Cambridge the visiting nursing association was obliged to discontinue the services of two child hygiene nurses, the child hygiene work of the city being turned over to the board of health nurses already carrying a full program. Melrose failed to replace a Red Cross nurse who resigned because of illness and in Reading one school nursing position was abolished. In Springfield, because of an increased demand for bedside nursing and a reduced budget the visiting nursing association found it necessary to withdraw its service to the prenatal clinic at the hospital.

4. Nutrition:

(*a*) *Emergency Nutrition.*

In the emergency nutrition program the burden has been very heavy for all of our nutritionists and they have given splendidly of their time and effort to assist communities and organizations throughout the State.

We have had frequent conferences with the State Departments of Education, Public Welfare, Agriculture, Labor and Industries, and the Extension Service, to strengthen the work throughout the State.

(*b*) *Community Work.*

In Lawrence, through the help of the Massachusetts Child Council and Mr. Conant, Commissioner of Public Welfare for the State, funds were secured for the employment of a nutritionist. A series of four group conferences was held for the discussion of the best returns to be secured for little food money. Home economics teachers, public welfare workers and public health nurses contributed to this discussion. Two major problems were found: (1) very inadequate aid was given to families; and (2) very little nutrition help was given the mothers of such families.

When the nutritionist was employed her major activities were to organize home economics classes to teach mothers how to plan, buy and serve seven days' meals on the low budgets granted; to can vegetables from gardens of the unemployed so as to provide each mother with one hundred cans of food for winter use; also to make a study of the needs in the homes. As a result of this there are now being carried on similar short courses as a regular part of the educational program, by local home economics teachers.

In Pittsfield, at the request of the local Board of Public Welfare, and the Visiting Nursing Association, similar group meetings were held. Here not as much help was received from State agencies but a volunteer nutritionist met with needy mothers. Another volunteer made a study of the use of foods by families under Veterans' Relief as a guide as to the wisdom of adding foods recommended by this Department. The Public Welfare and Veterans' Relief Departments in Pittsfield have been receiving from the State Department of Public Health nutritionists monthly recommendations on their food orders, which have brought about certain changes for the better.

In Northampton the Department Consultant in Public Health Nursing arranged a series of four group conferences to be addressed by the Consultant in Nutrition. At the close of this series of conferences the local agencies realized the need for nutrition service and plans were made for the appointment of a nutritionist under Federal Emergency Relief Administration funds when approved.

(*c*) *Public Welfare Food Plans.*

Commissaries. In cities where there was dire need the Department nutritionists assisted in the emergency food plans, with a saving of about thirty per cent through wholesale buying, and providing sufficient food for the recipients of food relief.

In Leominster an efficient commissary was organized, backed by public opinion. A saving of money was effected and a better apportionment of food secured for families on relief.

In Easthampton a commissary was started as an aid in lowering the tax rate. A nutritionist was appointed for three months to get the commissary started and to plan adequate diets, in the face of many difficulties.

Food Orders. Plans were made in communities for the distribution of food orders from local stores, at wholesale prices, plus a ten to twelve percent additional cost, to Departments of Public Welfare. This plan was effective in reducing costs about 20 per cent, besides keeping on the good will of local storekeepers. Hudson and Pittsfield are carrying on such a plan effectively.

Melrose Plan. This plan for food relief, as worked out by the nutritionist employed in Melrose, proved to be the best plan where adequate funds for a minimum cost diet are available. The Department printed this plan for distribution so that other communities may have the benefit of it, if desired.

Wellesley. The Department Consultant in Public Health Nursing was instrumental in securing the employment of a part-time nutritionist for Wellesley, to make home visits to recipients of welfare aid, and to make needed changes in the welfare food lists.

Advisory Service. Advisory assistance was given in food relief plans for Andover, Arlington, Boston, Cambridge, Chelsea, Clinton, Everett, Framingham, Great Barrington, Hudson, Lowell, Lynn, Middleboro, Monson, Newton, North Adams, Scituate, Seekonk, Waltham, Westford, Winchester, and Woburn.

Red Cross. Through a demonstration of a cracked wheat luncheon and a talk at the Metropolitan Chapter of the American Red Cross in Boston, the nutritionists convinced a group of social work representatives of the value of accepting 60,000 pounds of this whole wheat for distribution to the needy. The Department prepared recipes for the use of cracked wheat, to be enclosed with the wheat distributed, a total of 20,000 bags.

State Department of Public Welfare. The State Department of Public Health has been fortunate in having unlimited cooperation from the State Department of Public Welfare in its efforts to secure adequate nutrition for the recipients of welfare aid in the local communities.

(*d*) *Summer Camps.*

At the suggestion of the nutritionists a committee on Summer Camps was formed to discuss plans for adequate diets for children attending these camps. It was decided that the nutritionists making visits to the camps observe the food planning and remain over night at the camp to get a complete picture of the day's activities. A summary of the findings and recommendations of the nutritionists was prepared and sent to the camps in the fall.

Four camps employed student dietitians this year, a plan that had been urged at a meeting of the Camp Directors, called by the Boston Health League.

(*e*) *Chadwick Clinic.*

Special work has been done with regard to the children attending the Chadwick Clinics, from the homes receiving welfare aid. The Consultant in Nutrition presented a report of the most needy cases at a meeting of the State District Health Officers, urging that they be followed up, which plan is being carried out

Unusual assistance in carrying out the recommendations of the nutritionists on the Chadwick Clinics has been given the Department through the 4-H Club visitors, State Department of Public Welfare visitors, local boards of public welfare, and physical education directors.

Nutritionists of the Division were in attendance at Chadwick Clinics in Salem, 11 conferences; Beverly, 9 conferences; Danvers, 2 conferences; and Reading, 14 conferences.

(*f*) *Local Chest Clinics.*

In the local chest clinic at Milford the home economics teacher, with the help of the Department Nutritionist, carried on the nutrition side of the work successfully. At Milford, nutrition service from the Department was afforded for 15 conferences; Southbridge, 25, and Athol, 14.

(*g*) *State Teachers' Colleges.*

Fitchburg. At the request of the State Department of Education, the Consultant in Nutrition gave a new course in Nutrition from the Health Viewpoint, at Fitchburg State Teachers' College, to home economics teachers. This group was mainly teachers in day high schools rather than the usual group from evening and vocational schools. Fourteen cities were represented in this course of lectures.

The usual courses planned for evening and vocational school teachers were carried on by another nutritionist, as mentioned elsewhere in this report.

Hyannis. A course of nine hours, on six afternoons, was given at Hyannis State Teachers' College, on Normal Nutrition, to meet the need of nurses, the needs of the school child, and people in the community during the present economic emergency.

From the results of this course of lectures and those of the previous course given at Hyannis, it was decided that a more intensive course of perhaps thirty hours would be more beneficial to the nurses of the State.

(*h*) *Unusual Work with Grocers.*

The Commissioner of Public Health held several meetings with the chain store dealers and wholesale grocers early in the year. Following these a flood of requests for printed material on nutrition was received from these grocers for distribution to their customers. From the wholesale dealers came 1,700 requests for such material and 40 grocers, representing 28 different towns, received this material.

Another group of chain stores, reaching mainly Jewish families, requested low cost market orders for distribution to its branch stores numbering 106 in all within the State.

The New England district magazine for grocers and markets cooperated by printing editorials on protecting families from inadequate diets, and reprinting a pamphlet on Emergency Nutrition, by Sherman.

(*i*) *School Lunch.*

Wherever work on school lunches was carried on an effort was made to organize a functioning committee made up of representatives of the home, the school, the health group, and in the high schools the student representative, to meet with this committee occasionally. Special interest centered in the Cape Cod district in towns needing help in the preparation of suitable school lunches.

(*j*) *Dental-Nutrition Studies.*

State Sanatoria. At the State sanatoria for tuberculosis the main project was in connection with dental-nutrition studies. At North Reading Sanatorium consultation service with regard to meal-planning was given on several occasions.

At Lakeville Sanatorium particular work was carried on this year with the girls rather than the boys. Tomato juice was required daily and the dentist in attendance reported a marked change in arresting and preventing tooth decay among the girls included in the project.

At Westfield Sanatorium the girls from nine years of age up were included in the tomato juice diet and the results are encouraging, in spite of the small amount of time available for the nutritionist for concentrated effort at this Sanatorium.

Springfield Preschool Dental Clinic. The preschool dental clinic conducted under the auspices of the Junior League has had a full quota of children two mornings a week. The Department nutritionist supervised the nutrition teaching there for some time and this was done later by a nutritionist connected with the Visiting Nurse Association, with occasional supervision from the Department staff. Our nutritionist found here a need for more nutrition work with the mothers who come to the prenatal clinic, to stress the importance of proper nutrition in relation to the teeth. Great possibilities are foreseen here and it is hoped that a trained nutritionist may be employed for this purpose locally.

Ayer Project. Following a survey of mouth conditions in the first six grades in the Ayer schools, our nutritionist made home visits with the nurse on 72 children whose dental condition seemed to be due to nutritional factors. It was found that many needed more milk daily; more fruit, eggs and vegetables, particularly the raw vegetables; many were having too many sweets, tea and coffee. Many were in financial difficulties due to little work for the family and 21 per cent of the families were on welfare aid.

Nantucket.—This study was similar to that made in Ayer, with the exception that a group of children whose nutritional condition was below par was included. Here again many were found to lack the required amount of milk, eggs, fruit and vegetables; many were having too many sweets, tea and coffee, and about 50 per cent of the children needed more daytime rest.

(*k*) *Advisory Committee on Nutrition.*

Several meetings were held of the Advisory Committee on Nutrition for the discussion of the general Departmental nutrition program and particularly the material to be used with regard to adequate and inadequate diets for those receiving welfare aid, commissaries, and other problems arising during this period of economic stress. The various members of this committee rendered valuable assistance to the Department in these matters, individually and collectively.

(*l*) *Advisory and Consultant Service.*

The outstanding piece of advisory service in nutrition was that rendered at the Well Child Conferences. The nutritionist connected with the conferences held 1,414 nutrition conferences with the parents of 1,801 children. These conferences covered food for the various ages from six months to six years and often included suggestions for "whole family" dishes to include other children in the family. Much time was spent on the discussion of food habit training, stressing the importance of small servings at first, combinations of color in foods, proper flavor, which included the avoidance of scorching of foods, and the extreme importance of making a business of mealtime rather than considering it a time of amusement.

Conferences were held with students from Simmons College and Framingham State Teachers' College.

(*m*) *General.*

Many talks were given by the Consultant in Nutrition and the other nutritionists of the Division, mainly on welfare food allowances, budgeting and food planning for adequate nutrition.

Considerable time was spent on the preparation of material for posters for high school girls, radio talks on nutrition, news releases, and articles for the Journal of Home Economics and The Commonhealth, leaflets on How to Judge Nutrition, Adequate Diets at Minimum Costs, Fuel-Saving Devices, etc.

The following nutrition pamphlets were revised for reprinting during the year to bring the nutrition facts up to date: Cooking for Health, Good Eating Habits, Food for the Teens, One to Six, Aids to Bowel Movement, Keeping Well on a Low Wage, Two Dozen Ways of Using Cabbage, Feeding the Preschool Child, The School Lunch, and the nutrition section of The Baby and You.

5. Dental Hygiene:

(*a*) *Consultant in Dentistry.*

It was felt for some time that the dental hygiene work of the Department should have the added force of consultant service from the dental profession. Consequently, Dr. Leroy M. S. Miner, Dean of Harvard Dental School, and a member of the Dental Advisory Committee to the Department, was appointed as Consultant in Dentistry to the Department.

(*b*) *Dental-Nutrition Studies.*

The dental-nutrition studies, mentioned earlier in this report, were carried on in cooperation with the Dental Hygiene Consultant of the Division. The aim of the studies was to find dental-nutrition cases which Dr. Miner defined as "cases showing gingival caries, rampant caries or generally inflamed gums." Upon the findings of the dental hygienist and the nutritionist were based recommendations for supplementary foods, to be supplied by the community, as well as dental clinic service.

This is an entirely new approach to the problem of dental caries and points the way to more intelligent use of school dental inspections and proves that dental health and good nutrition, while acknowledged as inseparable in theory, can also be made so in community planning.

(*c*) *School Dental Clinics.*

1. Curtailment of Service.—The high peak in curtailment of dental clinics, due to the depression, was reached early in the year, affecting about twelve communities. In Medford a volunteer emergency clinic was established to care for those needing such service and in New Bedford the Women's Club financed some dental clinic work, but Quincy, Fall River, Pittsfield, Chicopee and Seekonk are still without any such service.

2. Traveling Dental Clinics. These self-supporting dental clinics have been of unlimited value in providing service to communities where there is no resident dentist. We have succeeded this year in spreading this service more generally using the spare time of the clinics not needed for the communities they usually serve to go to other communities having no service available.

The Southern Berkshire Health Unit clinic served Charlemont as well as its own district and was able to serve also the eastern towns of Hamilton, Wenham and Essex. Likewise the Hampshire County Red Cross forgot county boundary lines to the extent of sending its dentist to the towns of Wellfleet and Truro. Another dentist serves six towns in Middlesex and Essex Counties. The Worcester County Extension Service clinic is in its fourteenth year of service, with two units and two dentists operating.

(*d*) *Surveys.*

1. State-Wide. The Public Health Committee of the State Dental Society was brought to the fore this fall by the plan of the American Dental Association and the United States Public Health Service to survey the mouths of one-tenth of the elementary school population in Massachusetts. Our Dental Bulletin, our contacts with school dentists, and our wealth of information concerning dental needs and program in each town, have been placed at their disposal and our Consultant in Dental Hygiene is acting as field secretary for the survey. We welcome the stimulation that such a survey will bring to communities slow to realize the dangers of dental disease and the opportunity to obtain more definite information as to the real extent of dental caries and of dental care among the school population of Massachusetts.

2. City-Wide. In Springfield and Pittsfield city-wide surveys were made of existing facilities for dental service for both children and adults. The Division Consultant in Dental Hygiene assisted in outlining the desired information to be collected. These surveys are being carried on by a specially appointed committee of the Council of Social Agencies in the cities.

(*e*) *Periodontal Disease.*

The Consultant in Dental Hygiene is cooperating with the Dental Hygiene Council and the Division of Adult Hygiene in an educational program planned for the prevention of periodontal disease, which has been found to be as prevalent as dental caries and results in even greater loss of teeth. In many cases periodontal disease starts in the high school age group. This program was initiated late in the year and the plans include the preparation of educational material for physicians, nurses, high school students and the general public, and will include some of the new material proposed by the American Dental Association.

(*f*) *Dental Publications and the Private Dentist.*

This fall we followed New Jersey's plan of "making every dentist's office a distributing center for dental literature" by sending to all registered dentists in the State samples of three nutrition leaflets, suggesting that they order a supply from the Department, for their patients. The response has been beyond our expectations.

(*g*) *Southern Berkshire Health District.*

At the end of the first year of the dental hygiene program the Southern Berkshire Health District proudly points to definite accomplishments: traveling dental clinic service in every eligible town; dental care for needy children by local dentists in two of our eligible towns; 97 per cent of the school population with clean teeth; dental examinations at all Well Child Conferences held in the district; series of three lectures on dental nutrition to the public health nursing staff by the Consultant in Dental Hygiene of this Division.

(*h*) *Visits to Dentists.*

The school dental hygienists in eight towns and in the Southern Berkshire Health District have agreed to determine the number of school children who were able to visit a dentist (private or clinic) once during the school year. Dr. William F. Walker of the Commonwealth Fund felt that a record of single visits was of sufficient significance to be considered a definite accomplishment. The results of this study may influence our plans for the coming year, for up to this time we have asked communities to report only the finished cases or certificate cases.

(*i*) *Annual Dental Reports.*

An encouraging increase in the number of communities sending in annual reports of dental service is noted this year, as shown in the following table:

1928	1929	1930	1931	1932	1933
78	126	178	226	243	281

Of special note is the reporting from the northwestern district of the State, covered by Miss Whitteker as Nursing Consultant, where 100 per cent reporting was obtained.

These reports form the basis of our knowledge of existing needs for service and our plans for recommendation for further care. The response is especially significant as it implies a voluntary type of supervision.

(*j*) *Dental Certificates.*

The following table speaks for itself:

	1927-1928	**1928-1929**	**1929-1930**	**1930-1931**	**1931-1932**	**1932-1933**
No. cities and towns reporting	78	126	178	226	243	299
Elementary school population for Massachusetts	560,065	491,944	483,833	487,480	485,957	513,586
Dental certificates awarded by:						
School dentist at examination	–[1]	–[2]	–[2]	14,839	25,431	28,679
Clinic dentist	–[1]	23,052	45,989	51,624	64,106	68,901
Family dentist	–[1]	27,296	44,774	64,052	38,260	48,474
Total no. children receiving certificates	25,949	50,348	90,763	130,515	127,797	146,053
Percentage elementary school population receiving certificates	4%	10%	18%	25%	25%	26%

[1] Not reported separately.

[2] Not reported.

(*k*) *Dental Care for the Preschool Child.*

The results of dental examinations of 1,193 preschool children seen at the demonstration Well Child Conferences this year show that the rural preschool child in Massachusetts is as yet getting little or no dental care. Only 5 per cent of the group had ever been to see a dentist, and only 2 per cent had had dental defects corrected.

The following comparison of the dental examinations of the past three years shows little change in the rather encouragingly high percentage of mouths free from caries.

	1931	*1932*	*1933*
Number of children studied	634	1,279	1,193
Apparently non-carious	50%	43%	48%
Active caries	50%	57%	52%
Abscesses	6%	9%	8%
Number having had some dental care	13%	0%	5%

(*l*) *School Dental Association.*

The Massachusetts School Dental Association had a special meeting in the spring to discuss ways of stopping the threatened short-sighted economy in towns planning to discontinue dental clinics.

During the year four issues of the Bulletin of the School Dental Association were sent to approximately 1,700 persons, including all school dentists, dental hygienists, dental assistants, nurses, superintendents of schools and chairmen of boards of health conducting dental clinics. In November the entire issue was devoted to a general announcement from the Massachusetts Dental Society concerning the proposed state-wide dental survey of school children.

(*m*) *Dental Hygiene Council.*

The Dental Hygiene Council, as in past years, has been of assistance to the Department and has graciously responded to requests for answers to dental questions coming to the Department through the Health Forum in the newspapers, referred to our Dental Consultant through the Division of Adult Hygiene.

(*n*) *Massachusetts Dental Society.*

At the request of the Department, this year the annual district addresses of the President of the Massachusetts Dental Society included a discussion of the advantage of using dental certificates for child patients in the dentists' offices. Communities where a seeming lack of cooperation in this respect is evident, are receiving particular attention, the President conferring with the local dentists relative to the use of dental certificates.

The Department Consultant in Dental Hygiene is assisting the newly-formed Public Relations Committee of the Massachusetts Dental Society in collecting information regarding dental service in schools, hospitals, institutions and industries. It is hoped that this may prove fruitful in furthering the work of this Department.

(*o*) *Dental Advisory Committee.*

There were added to the Dental Advisory Committee Dr. Alice Blood of Simmons College, to represent the field of nutrition; Mrs. Harold Marvin (ex officio), President of the Massachusetts Organization for Public Health Nursing, to represent the nursing profession; and Miss Olive Ferguson, Supervisor of Tufts-Forsyth Training School for Dental Hygienists. Continued cooperation and advice were rendered by this Committee during the year with regard to the threatened curtailment of dental clinics, changes in rules and regulations with regard to dental hygienists, and dental hygiene program and plans of this Department.

6. Health Education:

(*a*) *Publicity.*

The Health Education Worker of the Division provided advance publicity for all the Well Child Conferences conducted by the Department. A concentrated advance program was arranged for the Well Child Conference project in Northampton, fifteen news releases being prepared for that community. Ten other conferences were covered by advance publicity for newspaper releases; five were prepared for diphtheria immunization programs; five for local Summer Round-Up plans, and two for the Child Health Institute conducted by this Division.

State-wide news releases were issued as follows: three for May Day-Child Health Day; three for Mothers' Day; one on Summer Suggestions for Health, and one on Entering School Physically Fit.

Five radio talks were written, four of these being broadcast by the Health Education Worker personally.

Special help on annual reports was another project carried on for the Nashoba Associated Boards of Health, for Winthrop, East Bridgewater, Milford and Dedham Visiting Nursing Associations, and written criticisms and suggestions were made at the request of the nurses from the following towns, concerning their annual reports: Abington, Malden, Milford, North Uxbridge, Norton, Somerset, Weston, Winchendon and Winthrop.

Detailed help was given with local publicity programs for Milford, providing a weekly news release, printed flyer and suggestions for distribution, and plans for a series of exhibits to be placed in store windows.

Lectures on Publicity were given before student nurses in seven hospital training schools, in the Harvard School of Public Health, at Simmons College School of Public Health Nursing, at Hyannis State Teachers' College Summer School, and before the Blackstone Valley Health Club.

Special scrapbooks on publicity material were prepared for reference for the use of members of the Department staff and others desiring such material.

(*b*) *Health Education.*

The Health Education Worker supervised an eight-lesson course in Health Education, consisting of twelve lessons given by members of the faculty to all students in the South Hadley High School, as part of their health education program.

Two demonstration teaching courses, of twelve lessons each, were given to sections of freshmen and sophomore classes in Hingham High School, and to senior classes at Chelmsford High School.

Other communities given service in relation to their health education program were Wrentham, Norwood, Manchester, Rockport, Northfield. In some of these communities the Health Council is functioning and stress was laid upon the importance of having such Councils where there were none, or at least the development of some form of health activity in the high school, no matter how small in the beginning.

Through the courtesy of the State Federation of Women's Clubs, the time allotted that organization was given over to the Health Education Worker for a broadcast on Health Councils in the High School.

Other health education work in schools included speaking at the assemblies in the following communities: Templeton, Medway, Florida, Middleboro, Lakeville, Rochester, Wellfleet, Shirley, Bridgewater, Wrentham, Hingham, Northfield, South Hadley and Chelsea.

A special two-lesson course in Personal Hygiene was given to patients at Lakeville State Sanatorium for Tuberculosis, and fourteen lectures were given on various aspects of Health Education, in communities throughout the State.

(c) *Pamphlets, Posters, Exhibits.*

There were four special numbers of the quarterly bulletin of the Department — The Commonhealth — issued during the year, devoted to the following subjects: The Child, Cancer, Control of Gonorrhea and Syphilis, and Epidemiology. There were distributed during the year over 20,000 copies of this bulletin.

The demand for pamphlets has increased, particularly those having to do with nutrition, budgeting, etc. Because of the economic conditions local departments of public welfare, as well as the State Department of Public Welfare and other relief agencies, appealed to the Department for assistance in securing food lists, budgets, low cost diets, and other pamphlets to aid them in the distribution of funds and foods to those in need of relief. Several of the churches and similar organizations made use of our printed material this year, particularly the preschool material for use in making home visits.

Printed material distributed during the year totalled as follows:

Child Health Day material	382,114	pieces
Summer Round-Up material	117,552	"
Other publications	1,090,403	"
	1,590,069	pieces

Our printed matter was distributed to other states to the number of 668 requests. Watch Your Step and Good Posture as a Business Asset were given mention in "The Progressive Farmer", following which 80 requests were received from other states for these two pamphlets. At the Eastern States Exposition in Springfield requests included 84 from other states, and at another meeting in Springfield (American Physical Education Association) 142 out-of-state requests were received. From these two meetings alone a total of 517 requests for printed matter came from residents of Massachusetts.

The requests from private dentists for pamphlets for their offices totalled 294, and 62,500 copies of Food for the Teens, Good Eating Habits and How to Judge Nutrition of Children were sent in response to this demand.

From foreign countries we had requests for printed matter from Canada, 19; England, 4; Czechoslovakia, 4; Brazil, 3; Hawaii, 2; France, South Africa, Switzerland, China, Australia and Mexico, 1 each. A nearly complete set of annual reports of the Department was sent to the Rome Central Institute of Statistics, Italy.

A remarkable achievement of the Health Education Worker-Artist this year was that of visiting supervisors of drawing in the local communities, distributing our printed material and poster suggestions. This project centered largely in parochial schools throughout the State where little work had been done heretofore, and where the material was very well received. Only a small portion of the State now remains to be covered with this particular material. This worker visited all the public and private schools in every community of the western and central portions of the State, the program being interrupted in the fall because of illness. For this project 156 cities and towns were visited and 116 parochial parishes were completed; 145 publ school officials and 140 in the parochial schools were contacted regarding this wor The slogan sheets for use in poster making were requested by public schools to t number of 72,950 and by parochial schools, 98,100, an increase of nearly 300 per cent over the previous year's demand.

In 1933 a total of 780,586 pieces of printed material was ordered for school use, as against a total of 403,487 pieces ordered in 1932 — almost a 100 per cent increase. Requests from public schools totalled 620,645 pieces, and from parochial schools, 159,941 pieces of printed material.

In addition to the numerous graphs, posters, charts, signs, etc., executed for the Division of Child Hygiene, the Artist completed 44 cloth charts, maps, plates and graphs for members of other divisions of the Department.

Three new exhibits were planned on Teeth, Diphtheria, and a Dental Exhibit for the special exhibit of the American Dental Association held at the Century of Progress Exposition in Chicago. These are all three-dimension exhibits and have been used to advantage on several occasions.

The Department exhibits have been displayed at Swampscott for the State Federation of Women's Clubs; at Springfield for the American Physical Education Association; in Boston for the Young Men's Hebrew Association, Massachusetts Dental Society, Child Health Day exhibit in a department store; in Cambridge, at Massachusetts Institute of Technology for the New England Health Education Association; at Springfield, Eastern States Exposition, and again for the Visiting Nurse Association of Springfield; in Bridgewater for the Visiting Nurse Association; in Medford for the Fellsway Council of Boy Scouts of America; at six Charm Schools of the 4-H Clubs in various parts of the State; and at all the demonstration Well Child Conferences held by the Division staff.

(*d*) *Library.*

Meetings of the Library Committee were held at intervals during the year for the consideration of purchase of new books, subscriptions and reprints.

(*e*) *Lectures, Motion Pictures, etc.*

There were given during the year 873 lectures and 147 radio broadcasts. This service was given 154 communities of the State and 8 talks were given out of the State at special conferences in the following places: Albany, New York; Danbury, Connecticut; Durham, New Hampshire; Manchester, New Hampshire; Orono, Maine; Providence, Rhode Island; New York City, New York; and Washington, District of Columbia. Aside from radio listeners, 48,612 persons were reached with the lecture service thus afforded.

Motion pictures were loaned to 99 communities and delineascope filmstrips were loaned to 35 communities of the State.

Posters from the Department were used in 4 communities through loan, in addition to the usual animal posters and nutrition posters provided for permanent use in local communities.

Exhibits were loaned to 50 communities during the year, 30 of these being in connection with the Well Child Conferences of the Division.

(*f*) *Prenatal and Postnatal Letters and Fathers' Letter.*

At the close of the year there were on the registry for the monthly letter service to prospective mothers and to mothers of children under two years of age approximately 23,000 names. The new requests for prenatal letters totalled over 6,100 and requests for the first year postnatal letters numbered about 6,200 during the year. The fathers' letter was sent to all families requesting prenatal letters, to the number of over 6,100.

II. Special Projects

1. May Day—Child Health Day:

Following out the plans made for the previous year, this project was left generally to the local communities. The Health Education Worker prepared letters to be sent to superintendents of schools and to school nurses asking them to further the project locally. Reports were received from 113 towns that had carried on a Child Health Day program, as compared with 207 in 1932; 125 in 1931, and 90 in 1930.

Detailed assistance was given the school nurse in Chelsea with her plans and two talks were given in this community as part of a Child Health Day program.

A complete report of the Child Health Day activities was written and sent to the American Child Health Association for inclusion in its report.

2. 4-H Clubs:

Putting Health into the 4-H Clubs Program was the subject of talks before seventeen of the 4-H Clubs and five groups of Club Leaders. In four counties six Charm Schools were held; in three of these, Bristol, Plymouth and Franklin Counties, none had been held the previous year. One lecture was given in New Hampshire, by the Health Education Worker, before the Homemakers' and 4-H Club members.

Health Teaching and Outdoor Cooking for Health were the subjects stressed at the camp work with Middlesex County Camp and at the State Camp at Amherst.

3. Franklin County Study:

The year 1933 saw the completion of the Franklin County Five-Year Demonstration Well Child Conferences. Follow-up visits to homes and schools were made by the Health Education Worker on 58 children who had attended the conferences held in Franklin County for five consecutive years. Following are statistics covering this demonstration period:

		Examinations
Number of examinations made:	1st year	1,470
	2nd "	1,314
	3rd "	1,393
	4th "	1,189
	5th "	1,230
	Total	6,596

				Examinations
Number examined:	Once only	2,149	54%	2,149
	Twice only	913	25%	1,826
	3 times only	469	13%	1,407
	4 " "	221	6%	884
	5 " "	66	2%	330
Number of children examined		3,818	100%	6,596

Defects found:			*Without Defects*
1st year.	1,721 in	1,021 children	449
2nd "	1,372 "	862 "	452
3rd "	1,474 "	862 "	531
4th "	1,449 "	744 "	445
5th "	1,651 "	801 "	429

Defects corrected:		
2nd year.	136	28%
3rd "	238	35%
4th "	159	25%
5th "	154	34%

4. Institute on Child Health:

The Eastern Regional Institute on Child Health was held at Hotel Bradford, Boston, and was well attended by nurses and others interested in child hygiene. This Institute was patterned after those held in New York State as a part of the State-wide staff education program given to public health nurses.

The morning session consisted of a symposium on the Physical, Mental and Social Aspects of Child Health, as well as a talk on Progressive Health Education by the Chief Consultant in Public Health Nursing.

The subject covered at the luncheon session was based on Article I of the Children's Charter, emphasis being placed on spiritual teaching and example, and the value of developing a sense of responsibility in the child. This session included also a talk on Leadership in Child Health, stressing the nursing side of the subject.

The afternoon session was given over to a panel discussion on Motivation in Child Behavior, the panel members representing the medical, nursing, social welfare, teaching and lay points of view.

Most encouraging comments were received concerning this plan of education and it will be carried out in other districts during the coming year.

5. Staff Education:

For professional improvement three of the public health nursing consultants completed a sixty-hour course in Teacher Training conducted by the State Department of Education. Another consultant in public health nursing took courses in Teaching Methods and Health Education at Boston University, and a course in Public Speaking under the auspices of the Division of University Extension. All the consultants in public health nursing, as well as other members of the Division staff, attended an intensive Institute for Nurses conducted by Mrs. Hodgson of the National Organization for Public Health Nursing, the conferences of the New England Health Education Association held at Massachusetts Institute of Technology, and the Eastern Regional Institute on Child Health held in Boston.

The Health Education Worker assisted in the monthly meetings of a Study Group conducted by the New England Health Education Association, serving as Chairman of the Program Committee for the group.

6. New Services Established:

In Wellesley new nursing service was established, a nurse being appointed by the board of health. In Ashby nursing service was developed through the Nashoba Associated Boards of Health.

New nurses' clubs were organized in Bristol County and in the western section of Norfolk County.

A new Well Child Conference was established in Groton and Shirley under the Nashoba Associated Boards of Health.

Toxin-antitoxin clinics were established in Abington, Randolph and Weymouth and on the Island of Nantucket.

III. Personnel of the Division

We regret to record the sudden death of Miss Ethel M. Shea, a stenographer in the Division for a number of years, whose service has been of value to all in the Division.

To fill the vacancy thus caused Miss Catherine M. Scannell was appointed as junior clerk and stenographer.

We are pleased to announce the appointment of Miss Ada Boone Coffey, R.N., as Chief Consultant in Public Health Nursing for the Department. Miss Coffey has had wide experience in the public health nursing field and comes to us from the New York State Department of Health where she served for many years as Extension Secretary, Public Health Nursing.

REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

Gaylord W. Anderson, M.D., *Director*
N. A. Nelson, M.D., *Assistant Director*

General Statement

The year 1933 has been marked by very striking declines in the incidence of certain diseases for which rational and effective control measures have been devised, notably diphtheria and typhoid fever. Coincidental with this has been a rather surprising decline in the death rate of certain diseases such as measles, for which one might normally have expected an increase owing to the economic conditions. Whatever may be the ultimate health effect of the current depression, there is certainly no evidence as yet that it has materially affected the incidence of communicable diseases. The only apparent exception to this is the somewhat greater case fatality of diphtheria, which may well be attributed to delayed treatment resulting from delay in summoning medical aid. During the year 84,304 cases of communicable disease were reported.

Prevalence of Special Diseases

Anterior Poliomyelitis. During the first six months of the year there was less infantile paralysis than has ever been the case at this season of year, this being apparently a continuation of the low incidence that had been noted throughout the year 1932. During the last week of June a focus developed in Boston in the vicinity of Roxbury Crossing. Cases very quickly appeared in other sections of the city and other communities in the Metropolitan Area with the result that July showed a higher incidence of the disease than has any corresponding month since 1916. August showed a decline in Boston, overshadowed, however, by a spread into the sections adjoining the Metropolitan Area together with some spread into the central part of the State. This was the peak month. After the middle of August the disease in the State at large declined rapidly so that by the middle of October the incidence was well below the average for this season of year. Three hundred fifty-three cases were reported, which is somewhat higher than for the average non-epidemic year. It is probable, however, that the reported endemic incidence of poliomyelitis will establish itself at a somewhat higher level than in previous years owing to the fact that the disease is being better recognized in its preparalytic stage. This is probably due to a far greater attention being focused on poliomyelitis by the physicians as a result of the activities of the Harvard Infantile Paralysis Commission in recent years.

The plans for collecting and distributing convalescent serum which were worked out following the 1931 outbreak and put into effect last year have been continued with very satisfactory results. Under this method, while consultants can be obtained to assist the physician in the diagnosis of the preparalytic case and the administration of serum if required, it is possible for a physician or hospital to obtain serum for the preparalytic case without resort to such a consultant. Except in one or two instances, this plan has been thoroughly successful and it has been possible during the past summer to smooth out a few of the rough spots that have developed in this plan.

At the beginning of the season the Department had on hand convalescent serum which had been obtained late in 1931 and early in 1932. Before this was re-processed and released for distribution, it was tested for potency on monkeys by the Harvard Infantile Paralysis Commission and found to have as high a neutralizing value as did fresh serum.

During the summer bleeding clinics to obtain serum were held in Boston, Cambridge, Framingham, Greenfield, Holyoke, Newton, Quincy, Salem and Worcester, 156 donors volunteering, of whom 128 were bled to yield 33,645 cc. of blood before processing. Consultants of the Department saw 57 cases in consultation with physicians.

There may be reasonable doubt as to the wisdom of the Department in continuing to furnish convalescent serum for infantile paralysis. From both laboratory and clinical evidence that is at present available, there is certainly considerable doubt as to the value of this serum in the treatment of any case, even in the preparalytic stage. Whatever might be its value as a prophylactic, the available supply does not permit its use for this purpose. In distributing the serum the Department makes no guarantee as to its value, assuming responsibility only as to sterility. Great as may be our skepticism as to the therapeutic value of this serum, it seems apparent, however, that its continued distribution is advisable in that it may have a reassuring influence upon the public and thus to some extent allay the panic that inevitably occurs when it is known that infantile paralysis has occurred within a community. This psychological value is probably so great as to justify the procedure.

Diphtheria. The past year has seen a steady decline of both cases and deaths from this disease, 1,041 cases and 86 deaths being reported as compared with 1,811 cases and 107 deaths for 1932. The most disquieting feature has been the increased case fatality rate which this year rose to 8.3 which is the highest since 1918. It is unlikely that this can be explained on the basis of poor reporting of cases. A more logical explanation is to be found in the delay in treatment, due to the fact that the economic situation has prompted many to delay in calling a physician as long as possible. That such has been an important factor is evident from the markedly increased fatality rate in several of the cities where the economic situation has been particularly serious. Two other factors probably contribute to a lesser degree, namely, a lessened apprehension on the part of the public due to the relative rarity of diphtheria, and somewhat less alertness on the part of the medical profession in recognizing the disease. This increased fatality rate is, however, a phenomenon which is probably to be expected as the disease becomes more and more rare and is merely accentuated by the economic situation.

Diphtheria immunization, which has been so actively furthered by this Department for over ten years, is rapidly finding its place as an accepted part of the community public health program. In the majority of the cities and towns in this State some immunization work is carried on every year under official auspices. This has permitted the Department to concentrate its efforts upon those few communities which have failed to appreciate the opportunities for diphtheria control through such measures. In the report of last year it was stated that about fifty communities had still failed to make any provision at any time for such immunization. This number has been rapidly reduced during the past year so that today there remain only thirty-two, the largest of which is the town of Marblehead. Among the communities which have done a slight amount of immunization but failed to make provisions which are in any sense of the word adequate, may be mentioned Haverhill and Clinton. Both communities present an unusually large number of susceptible children and unless some active steps are taken in the near future it is but a matter of time before they will pay the toll of negligence. Lowell presents the tragic picture of a community which, after an active immunization program had materially reduced the diphtheria rate, rested on its laurels for the ensuing three years. The result was inevitable and the past two years have found the city with the unenviable distinction of the highest diphtheria death rate in New England. And yet as the year closes there is no evidence of a disposition to correct this condition and the scene is apparently set for a repetition of this questionable honor in 1934. Notable among the communities which were formerly in need of more active immunization but have during the past year remedied the situation may be mentioned New Bedford, Randolph, Salem and Weymouth. West Springfield a year ago stood out as the largest community which had failed to ever provide for immunization. During the spring, after the community had failed to appropriate anything for this, preferring to spend its money on certain trivial matters, Dr. Miner took hold of the situation and personally immunized 2,000 children. Although it is probably unsound as a policy for the State to intervene where the community refuses to save itself, the Department has none the less a certain obligation to the children in any community who have no voice in the appropriation but who are the potential victims, should the disease appear.

During the past year there has been in a few communities some agitation for the discontinuance of clinics on the grounds that this work should be done in the offices of the family physicians. True as this may be, the fact is inescapable that unless there is a stimulus through clinic work this immunization is not accomplished. Studies by the Department during the past year have shown conclusively that the clinics rather than interfering with the physicians' practice actually stimulate a greater demand for immunization in the private office of the physician. Ultimately we should, of course, look forward to the time when diphtheria immunization will be as much a part of the routine care of the first year of life as is the regulation of the baby's formula. In the practice of the pediatricians this is already the case. Unfortunately, however, the general practitioners have not yet sufficiently availed themselves of this opportunity for the practice of preventive medicine. This is a situation which cannot correct itself overnight, but we can well look forward to an increasing amount of immunization in the doctor's office so that ultimately the clinics may in reality be used only by those unable to afford private service.

Dysentery, Amebic.—This disease, which has been of mere academic interest for so many years, assumed greater importance during the latter part of the year due to the presence of cases emanating from Chicago. The low incidence of amebic dysentery in the northern tier of states has been a mystery for many years inasmuch as surveys have shown that as high as 10 per cent of the population may be carriers of the disease. Possibly the scarcity of the disease has been more apparent than real, some cases escaping recognition under the general classification of ulcerative colitis.

Early in November it became generally known that many persons who attended the Century of Progress Exposition at Chicago had contracted the infection in that city. Some of these were apparently infected as early as May or June, but the situation did not become recognized for some time owing to the fact that the cases were scattered in all sections of the country. Although the information as to exactly what happened in Chicago is still incomplete, it is apparent that the infection was centered around two or three neighboring hotels. It is increasingly apparent that there was no widespread infection through the city but that for some unknown reason a peculiar circumstance within these hotels resulted in an astonishingly high attack rate among those who ate there. Eighteen of these cases have been in Massachusetts, two of them resulting fatally. Most of the Massachusetts cases were among members of the American Legion who stayed at these hotels during the annual convention at Chicago.

In order to minimize the ill effects of these infections already contracted, the Department circularized all Legion Posts, calling their attention to the situation and recommending that those presenting intestinal disorders consult their family physicians. The situation was likewise called to the attention of all boards of health, and, through the New England Journal of Medicine, of all physicians. Furthermore, diagnostic aid was offered to physicians and hospitals in the recognition of suspected cases.

At the present moment it does not appear that this Chicago outbreak will constitute any widespread menace to the country at large. Control measures through routine examination of all food handlers, while theoretically ideal, present so many technical difficulties as to be impractical. In Chicago, where such methods were attempted, they would appear to have been a complete failure, as evidenced by the fact that they were begun during the latter part of August, yet the majority of the Massachusetts infections were contracted during October. Until more is known about the epidemiology of this disease, the most practical control measures lie in the strictest sanitation of all food-handling establishments.

Dysentery, Bacillary.—This disease continues to be the bane of certain institutions, where it may persist for long periods of time, in spite of usual control measures. Plans are now under way for attempts at control through the use of vaccines. Certainly in dealing with such institutions this method, if effective, offers more promise than the conventional reliance on aseptic precautions, inasmuch as the institutions involved are those in which these precautions are virtually impossible of attainment.

Encephalitis Lethargica.—During the latter part of the summer there developed in St. Louis an outbreak of encephalitis which differed somewhat from the typical encephalitis lethargica, resembling more closely a type of encephalitis described in Japan in 1924. This outbreak in St. Louis was given a great deal of newspaper publicity causing considerable apprehension as to possible spread of the disease to other parts of the country. This publicity gave to all cases of encephalitis a certain news value, with the result that cases began to be reported from all parts of the country. Viewed in retrospect, however, there is no evidence at the moment that this condition which occurred in St. Louis spread to other sections. This matter is being further studied by the United States Public Health Service. In Massachusetts there was not the slightest evidence of abnormal prevalence of encephalitis, 27 cases and 16 deaths being reported as compared with 22 cases and 19 deaths for last year. This is one of the lowest figures recorded since the disease was made reportable, indicating a continued decline since the somewhat explosive outbreak at the beginning of the last decade.

Epidemic Cerebrospinal Meningitis.—With only 50 cases and 25 deaths reported as compared with 83 cases and 34 deaths a year ago, this disease reached the lowest level ever encountered in this State. This is certainly the result of good fortune rather than of good management, as nothing is known today which can be considered effective in reducing the incidence of this disease. This same low incidence has been characteristic of the entire country, the only evidence of increase having appeared around Chicago during the early part of the year. This increased prevalence in that section of the country is apparently unimportant as it has not been carried over into the latter part of the year.

Influenza.—During the fall of 1932 a wave of respiratory infections, variously diagnosed as influenza or grippe, began in the western part of the country, progressing steadily across the continent and reaching Massachusetts about the beginning of January, 1933. It was widespread throughout the State, had a very high attack rate and persisted in a community for about four to six weeks. By the end of February it had virtually disappeared. As a result of this wave of respiratory conditions the pneumonia death rate for these two months increased to somewhat less than twice the usual figure for this time of year. This slight increase in the death rate bespeaks the mildness of this infection as contrasted with the type of influenza that was seen in 1918.

Owing to the mildness of the condition it was inevitable that dispute should arise as to its proper designation. In many parts of the country it was labeled influenza. Throughout New England there was a tendency to label it as grippe. As this latter is not reportable the student of the morbidity statistics might have concluded that the wave had died out as it approached the northeastern corner of the country. Such a conclusion would be entirely contrary to fact. For this reason it was the feeling of the Department that the reporting of influenza as such served no useful purpose and at the same time had a disadvantage in that it created a certain public apprehension. Consequently influenza was removed from the list of reportable diseases under date of May 9th.

In order to obtain current information as to the prevalence and severity of such infections whenever prevalent, there has been developed a plan of reporting which includes school absences, case load of visiting nursing associations, and frequency of pneumonia deaths in selected communities. Through the cooperation of several superintendents of schools, the Department is receiving weekly reports as to absences, it being assumed that sudden variations from the average will in all probability be due to respiratory conditions. Similarly, weekly reports as to the case load of selected visiting nursing associations are being obtained, the figures being used with the same assumption. The purpose is not to measure the relative incidence in the several communities, but rather to note the variations from week to week within individual communities. A preliminary trial of this method during the first part of the year showed that in this way a reliable index of respiratory conditions might be obtained. In order to assist in determining the severity of the conditions, several boards of health have agreed to report weekly the number of broncho-pneumonia deaths within their communities. This, coupled with the reports legally required as to lobar pneumonia deaths, gives what is probably a reliable index as to severity. It seems unlikely that during the current winter we will have any abnormal prevalence of respiratory conditions. We shall thus be able to establish a fairly normal base line for each of the several communities so that when the next wave arrives it can be studied more carefully than heretofore.

Malaria.—Twenty-eight cases of malaria were reported. Leaving out of consideration the therapeutic cases, all but two gave histories showing a probable source of infection outside of Massachusetts.

Measles.—The past year has been noteworthy with respect to measles owing to a surprisingly low death rate, for which no satisfactory explanation is forthcoming.

The incidence of cases was not remarkable, 15,067 being reported. During the first part of the year these were largely in the Connecticut River Valley, shifting to affect the Worcester area during the fall. As the year ended measles was increasing rapidly in the Metropolitan Area. That the death rate should have fallen to barely half that of last year, which was the lowest ever previously recorded, is especially remarkable in view of the current economic situation. It would be comforting to think that the public was finally becoming conscious of the importance of measles in smaller children and was therefore exercising greater care with respect to this age group. Only time can tell how material has been our progress along this line. It is in this direction, however, that educational programs must be directed, supplemented by facilities whereby a physician may prevent or modify the attack among small children known to have been exposed to the disease. A year ago a project was proposed to two Foundations whereby a study might be made of the effectiveness of normal adult serum for the prevention or modification of measles. Funds for this purpose were not forthcoming. A similar project has subsequently been started in England. In the meantime, however, the studies of McKhann at the Children's Hospital in Boston have opened a promising field in the use of placental extract for this purpose. The next year or so will probably see rather rapid progress in this field of measles prophylaxis, selectively applied to those in whom the risk of the disease is the greatest.

Pneumonia, Lobar.—The first half of the year showed a continued decline of lobar pneumonia reflected both in the morbidity and mortality. During the second half of the year, however, there was a very marked change, so that the year ends with pneumonia at a higher level than for several previous years. This increased prevalence has occurred likewise with respect to bronchopneumonia as shown in the death rate and will probably materially affect the death rate of both whooping cough and measles for the coming year.

Psittacosis.—No cases of this disease were recognized during the past year. It was pointed out in last year's report that the United States Public Health Service had placed such restrictions around the interstate shipment of parrakeets that no bird might be shipped without a certificate from the State Health Department. Fortunately, the number of birds shipped out of Massachusetts is so small that it is no burden, only seven such having been applied for in the past year, all of the applications being granted. Although this method will unquestionably prevent the shipment of birds that are obviously sick, the evidence that is appearing as to the presence of healthy carriers can only mean that even with this precaution there is no complete protection against this disease. During the latter part of the year the State Health Department of California, from which state most of the infected birds have been coming, instituted a plan whereby a copy of the certificate which they issue is sent to the local health authorities, thus enabling them to inspect all birds coming into the community. This will unquestionably be of some assistance in that it will enable the local board of health to guard against the sale of birds obviously infected.

Rabies.—At the beginning of the year rabies in animals was at a lower level than at any time during the past five years, this being a continuation of the unusually low incidence of the previous year and a half. About March the disease began to appear with increased prevalence in Boston and Newton. These two communities have served as foci from which the disease has spread outward, so that as the year ends the incidence of the disease has risen to the average of a five-year period. The spread has been largely into the North Metropolitan and proximal sections of the Northeastern District, with a slight spread northwest. During November it began to spread southward into Norfolk and Plymouth counties, which may well be the beginning of a wave spreading through the southeastern corner of the State. In other parts of the State, the disease has been virtually non-existent. A focus around Pittsfield which had been troublesome for the past two years has apparently died out. The same has occurred around Worcester, so that the western half of the State has been completely free of rabies since February.

There has been a somewhat increased interest in the possibilities of rabies control through immunization, clinics for this purpose having been conducted during the past year in Framingham, Natick, Newton and Watertown. However imperfect this method may be, it is probably a far sounder procedure and one of more lasting and far-reaching value than the somewhat more drastic and strong-armed method of restraining orders. During the year the Massachusetts Veterinary Association made available popular flyers dealing with the control of rabies and emphasizing the value of vaccination of dogs. The Department has assisted the Association in the free distribution of these through the local boards of health.

One human death from rabies occurred. In this instance the victim, a three-year-old child, had been severely bitten on the face and shoulders. The dog was apprehended and killed, the laboratory report showing rabies. Unfortunately the wounds were not cauterized and treatment was not instituted until the result of the laboratory report was available, which was delayed owing to the fact that the head was not shipped to the laboratory immediately. The severity and location of the bites, the failure of the physician to cauterize, and most of all, the delay in treatment all contributed to the fatal outcome.

Scarlet Fever.—This disease has been unusually prevalent during the past two or three years. During 1932 it reached a higher level than ever previously recorded, due in large part to its widespread incidence in the Metropolitan Area. Beginning the early part of 1933 scarlet fever became less prevalent in this section of the State. This drop was to some extent offset by an increased prevalence in the Southeastern District. With the beginning of the fall scarlet fever became unusually prevalent in the southeastern corner of the State and showed signs of increase in the Northeastern District. Its unusually low incidence in the Metropolitan Area has, however, reduced its incidence during the last three months of the year to a figure markedly lower than at any time for several years.

The control of scarlet fever presents today one of the most troublesome administrative problems in public health. Because of the extreme mildness of the cases, isolation and quarantine procedures have been virtually useless in prevention of the spread of the disease. This has resulted in an unusually high attack rate, which in the smaller communities has brought about a certain degree of popular panic. This has manifested itself through frantic efforts to control the disease by methods which are as useless as they are dramatic, namely, the closing of schools, fumigation of school buildings, burning of school books and the like. It is certainly a sad commentary upon the progress of popular health education to find that the public still demands such measures which have been demonstrated so many times to be useless. Unfortunately, many boards of health and many members of the medical profession have advanced no farther.

In the report of a year ago reference was made to studies in scarlet fever immunization carried on by the United States Public Health Service, with whom this Department has been cooperating. This has depended upon the active immunization of children through the use of scarlet fever toxoid. This has been used in several institutions in this State for over two years with highly satisfactory results. For over a year it has been made a routine procedure in the Department's sanatoria for childhood tuberculosis with a complete disappearance of scarlet fever from these for the first time in many years. At the Wrentham State School for the Feeble-Minded, where this immunization has been carried on for over two years, an occasional case of scarlet fever has developed among new admissions not yet immunized, but there have been no secondary cases among those immunized and found to be Dick negative. One case developed in a child that had had the toxoid but who on testing had been found to be not yet rendered immune. As the Public Health Service has completed its studies in this State, permission has been obtained from the Scarlet Fever Commission to manufacture the toxoid for further studies. As the year ends the Department is beginning a more extensive demonstration and study of this material through immunization in the public schools of Wellesley. This is a community which should have a reasonable amount of scarlet fever during the coming winter, so that a further clinical test may be made by observing the relative incidence of scarlet fever among the immunized and the non-immunized. Over 800 children have been tested, of whom 84 per cent were found to be susceptible. These have already been given the first injection, the subsequent two injections to be given during January, 1934. It is hoped that we can use this toxoid likewise in one or two other communities during the winter as well as in several other institutions throughout the State. If the early results which have been so encouraging are substantiated on the basis of this broader experience, we can look forward to the day when an active program of scarlet fever immunization can be carried on similar to that which has been conducted against diphtheria with such striking success.

The use of scarlet fever convalescent serum for passive immunization of family contacts in the hope of reducing the secondary attack rate has been given a trial in Newton and in Hingham, in both communities with marked success. This method does not, of course, yield any permanent protection, but does cut down the secondary attack rate and affords to the family physician something definite that he can do to protect the other children in a household where scarlet fever has already appeared. Lacking such a method, he is virtually helpless in protecting these exposures. There is a further material advantage in that the reduction of secondary cases constitutes a sufficient saving in hospital bills to more than offset the expenditure of money for the remuneration of donors. Late in the year Arlington, Brockton, and Watertown began similar programs. In these cases the local board of health has found the donors and given them such remuneration as was thought locally advisable. The Department has performed the bleeding, processed and bottled the serum and returned it to the local board of health for distribution under whatever plan this board of health considered best suited to the community. In Newton, whenever a case of scarlet fever was reported, the physician was offered one dose of serum for every susceptible child under fifteen years in the household. Although there will never be any permanent control of scarlet fever through this method, it is a very useful addition to the resources of the physician and the board of health.

Septic Sore Throat.—Two hundred six cases of septic sore throat were reported as compared with 232 a year ago. As will be noted below, under the discussion of milk problems, many of these cases were parts of two outbreaks of streptococcal infections, some of the cases presenting a picture of a septic sore throat, whereas others were clinically typical of scarlet fever.

Smallpox.—For the first year in the history of the State, no case of smallpox occurred. Although the State has enjoyed for some time a remarkably low smallpox incidence and one which during the last decade was lower than that in any other State in the Union, there has been every year an occasional case, some years as low as but two cases. Nineteen hundred and thirty-three marks, however, the first year of complete freedom from the disease.

Tuberculosis, Pulmonary.—The past year has seen a decline in reported incidence of tuberculosis. The first half of the year saw likewise a decline in deaths comparable to that which has occurred for the past few years, but this decrease was counteracted by an increase during the latter half of the year resulting in a death rate slightly in excess of that for 1932.

Typhoid Fever.—Continuing the rapid decline in typhoid fever that has occurred during the past few years, this disease reached a new low level with 162 cases reported and 22 deaths. It will be noted that the decline in deaths was not as great as was the decline in cases. This is hardly cause for comment, however, in view of the small number of deaths. The decline during the year has been due probably to two factors. One of these has been the surprising absence of localized outbreaks, the largest for the past year being only five cases. Never before has there been a year so free of outbreaks of considerable size. Another factor in the decline has been a decrease in the amount of endemic typhoid. This is unquestionably due to a rapidly decreasing number of unrecognized typhoid carriers in the State. Owing to the rapid improvement in the public water supplies during the latter part of the last century, the typhoid rate declined rapidly. Many of those who became carriers because of infection at that time have now reached the age at which death is occurring from natural causes. Owing to the continued decline of typhoid their place is not taken by new carriers. The result is therefore a rapid trend toward a sterilization of the community so far as concerns typhoid infection. It is therefore, only reasonable to expect that each year will see a lower level of endemic typhoid. This figure is already so low that the total for the State may be seriously affected wherever a localized outbreak of any magnitude occurs.

During the past year there has been an increased interest in the detection of typhoid carriers. As will be noted from the following table, more carriers were found per unit number of cases than in any previous year:

Year	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases
1929	307	6	2.0	4	1.3
1930	318	9	2.8	5	1.6
1931	250	6	2.4	4	1.6
1932	214	13	6.1	10	4.7
1933	162	19	11.7	14	8.6

Of particular note are two found through the enterprise of the Springfield Board of Health, one each by Worcester and Fall River, and one by the Massachusetts General Hospital. This is the first year that any material interest has been shown in carrier discovery by local boards of health. If others showed as much interest as have these, the discovery of sources would be much higher.

The carrier list has grown from 73 at the beginning of the year to 91 at the end. Four carriers died from conditions unassociated with their carrier condition, and one was removed from the carrier list as cured following gall bladder removal a year previously. Of the 19 carriers added to the list, 14 were found through investigation of cases, 3 were recognized through routine examination of specimens submitted during convalescence, and two moved into this State. Six carriers submitted to gall bladder removal in the hope of cure of the carrier condition. One of these was the attendant in a children's institution, to whom reference was made in last year's report. A number of specimens since operation have been negative. Likewise, the nine-year old Milford boy, to whom reference was also made, was finally brought to operation. A large stone was removed with the gall bladder. Although weekly specimens since operation in September have shown some fluctuation, the last seven specimens, one of which was the result of an artificially induced diarrhea, have been consistently negative, indicating that there is considerable reason for hoping that a cure has been achieved. A third carrier discovered during the previous year, had her gall bladder removed at her own expense, the Department having refused to accept responsibility for this case. Stool specimens in this instance have been consistently positive after operation, this being the first instance we have had of failure of cure. A fourth carrier, who had her infection several years ago and had during the past summer become so unconcerned about her carrier condition as to do cooking for other people, thereby causing two cases, one of which was fatal, finally submitted to operation with what appears at present to be satisfactory results. Two other carriers, one of whom had his infection eleven months prior and the other ten months prior, submitted to gall bladder removal, and in both instances negative specimens have been repeatedly obtained since operation. In the former of these, small soft stones were found, which may well have been the beginning of larger calculi. In the latter, there was no suggestion of stones though typhoid organisms were cultured from both the bile and from the scrapings of the mucosa. These two cases are of special interest, indicating that although the previous existence of stones may favor the development of the carrier condition it is not an essential prerequisite.

Three known carriers were responsible for five cases of typhoid. Two of these apparently originated from an attendant in an institution who had been repeatedly warned as to food handling, one came from the carrier in Palmer to whom reference was made a year ago and who had presumably been under quarantine enforced by the local board of health, and two were in Byfield, to which community a carrier had moved without notifying either this Department or the local boards of health concerned. She was rediscovered only after the occurrence of the cases. A carrier in Shirley was probably the source of a case, who in turn infected three other members of her family.

Of the 162 cases reported, the source of infection was found in 32 instances, 18 of which were due to contact with previously unrecognized carriers, six to contact with carriers previously recognized and eight to contact with another case of typhoid.

Apprehension as to a possible outbreak of typhoid fever in Methuen resulted from pollution of the town water supply due to a break in one of the wells when the well field was flooded by the Merrimack River during the spring freshets. Consequently, with the cooperation of the local board of health, clinics were held in Methuen for the anti-typhoid inoculation of all wishing this protection. About 4,500 persons appeared in the clinics and about 1,000 individuals were inoculated in the offices of their family physicians. Fortunately, the outbreak of typhoid which was feared did not develop, due apparently to the fact that the break in the well was discovered shortly after it had occurred and to thorough flushing of the mains and disinfection of the storage reservoir. The situation was, however, so hazardous that the precautions of community immunization were certainly justified.

Undulant Fever.—Eleven cases of undulant fever were reported. As further experience is gained it is becoming increasingly apparent that there is little reason for fearing any such devastating wave of undulant fever as was predicted several years ago. The reasons underlying the low incidence of disease in humans using milk from infected cattle are still obscure. It seems certain, however, that so long as raw milk is consumed an occasional case will be found. Although there is considerable discussion of a program to eliminate contagious abortion among cattle in a manner similar to that used for tuberculosis eradication, it is unlikely that this will ever assume the public health aspects of the latter program. Pasteurization continues to be our best and most practical safeguard against this disease.

Whooping Cough.—With 9,834 cases of whooping cough reported, this disease reached a higher level than at any time since 1930. This increased prevalence was due entirely to a rapid increase during the latter part of the year when the disease has occurred at a higher level than ever previously recorded. While the death rate during the first half of the year was at a new low level, the change during the latter part more than counteracted the early gains, the year ending with 97 deaths as compared with the 1931 record of 88.

Outbreaks

February.—Scarlet Fever; Hingham, Weymouth and Quincy. A milk-borne outbreak of scarlet fever occurred in Hingham, Weymouth and Quincy, spread by raw milk from a Hingham dairy. In addition to the frank cases of scarlet fever, there were several of septic sore throat, one of these latter being fatal. Likewise there were one or two cases which, previously having had an acute throat infection, developed an erysipelas-like eruption. Hemolytic streptococci were found in the throats of the milker and three other members of his family, in the milk from one of the cows that had an infected udder, and in the udder when examined at autopsy. Forty-three cases; two deaths. Within the next few months many cases of scarlet fever were traced as due to contact with sources arising directly or indirectly from this outbreak.

February.—Trichinosis. Home-made pork sausage distributed among the Italian colony in Lowell resulted in 21 cases of trichinosis which occurred as follows: 11 in Lowell, 4 in Tewksbury, 1 in Chelmsford, 2 in Somerville, 1 in Wakefield, 1 in Lynn, and 1 in Cambridge. 21 cases; 1 death.

March.—Gastro-intestinal disturbances; Newton and Fall River. In Newton and Fall River there occurred almost simultaneously rather sharp outbreaks of gastro-intestinal disturbances marked by sudden onset with nausea, vomiting and malaise, with diarrhea a less common characteristic. In Newton these cases were fairly prevalent for a period of some two weeks, while at Fall River they were concentrated within a few days. No source of infection was discovered, the water supplies being found free from pollution.

April.—Scarlet Fever, East and West Bridgewater. Ninety-five cases of milk-borne infections occurred in East and West Bridgewater, due to the consumption of raw milk from an infected herd in the former town. In practically every home on this route, there were cases of either frank scarlet fever or sore throat with cervical adenitis. Examination of the herd showed the presence of one cow with an acute mastitis, and another with a healing mastitis. From the former, hemolytic streptococci were obtained. Both cows were slaughtered, and in each instance an abscess was found within the udder. Cultures from the abscess in the cow with the healing mastitis taken at autopsy were also positive for hemolytic streptococci. There were 57 cases of scarlet fever with 1 death, and 38 cases of sore throat.

April.—Gastro-enteritis, Northfield. Coincidental with the heavy rains, there was an outbreak of gastro-enteritis in East Northfield and at the Northfield School, both of which obtained water from the East Northfield Water Company, owned and controlled by the School. It was found that, contrary to the repeated recommendations of this Department, the company had been carrying on lumbering operations on the water shed, there being evidence of pollution within a hundred feet of the reservoir. The outbreak which involved some 10 per cent of the population was short-lived.

April.—Paratyphoid B., Boston. Four patients admitted to a general hospital for treatment of surgical conditions developed paratyphoid B. either while in the hospital or after return home. Investigation revealed that the mode of transmission was probably through incomplete sterilization of rectal tubes.

June.—Gastro-enteritis, North Brookfield. On June 26 a wedding breakfast was served to approximately 60 guests. About 40 of them were taken ill 26 hours later with a gastro-intestinal upset. The only article of food common to all was a combination sandwich, consisting of veal, turkey and celery. Food samples and stool specimens from the woman who prepared the food were found to be negative.

June.—Sore Throat Outbreak, Cambridge. Twenty-four cases of sore throat occurred among college students, all but two of them among members of the freshman class. The only thing common for the group was that with two exceptions all took their meals at a certain club. Careful questioning as to the actual meals partaken revealed that 22 had been present at a certain meal at which 20 of them, and possibly the 21st, had eaten pressed lamb and potato salad. No food specimens were obtainable. Cultures of the group yielded hemolytic streptococci. Although there had been no illness within the kitchen staff, the butcher, vegetable man and bus boy were found to carry hemolytic streptococci in their throats. 24 cases; no deaths.

July.—Gastro-enteritis, Sharon. A small outbreak of gastro-enteritis involving a number of campers and counsellors at a health camp. The source of infection was not found. 30 cases; no deaths.

July.—Typhoid Fever, Northboro. Three cases of typhoid fever in one family with the onset in each given approximately as July 21. Sanitary conditions were poor, the well being grossly polluted. 3 cases; 1 death.

July-August.—Typhoid Fever, Newbury. Two cases of typhoid fever with one death due to a known typhoid carrier who continued to handle food for others in spite of repeated warnings from this Department. A cholecystectomy was subsequently performed on the carrier.

August.—Typhoid Fever, Shirley. In July one case and in August 4 cases of typhoid fever occurred in a family which lived near a known typhoid carrier. Conflicting stories were obtained as to contact with this carrier. 5 cases; no deaths.

August.—Pleurodynia, Lakeville. There developed in a boys' camp during the latter part of July and the first of August a number of cases of short duration, of an illness characterized by fever, headache, nausea, and pain in the upper abdomen and lower chest. In general the cases were well within 24 hours. One case was sent to a Boston hospital, where diagnosis of pleurodynia was made.

September.—Typhoid Fever, Oak Bluffs. Two cases of typhoid fever developed among the personnel of a summer hotel. A maid employed throughout the summer had had an unrecognized case of typhoid during the previous winter and was still a carrier. She has subsequently had a cholecystectomy performed.

October.—Gastro-enteritis, Northampton. An outbreak of about 100 cases of gastro-enteritis occurred in a girls' college. Although the evidence was not conclusive, it was felt that the outbreak was spread by food handlers.

October-November.—Diphtheria, Lowell. A small localized outbreak of diphtheria in an orphanage and its attendant day school in Lowell.

November-December.—Amebic Dysentery. There were 18 cases of amebic dysentery with 2 deaths, originating in Chicago.

December.—Typhoid Fever, Lowell. Three cases followed a party, the sandwiches for which were prepared by a person subsequently found to be a carrier.

Gonorrhea and Syphilis

During 1933, 1,067 physicians reported either gonorrhea or syphilis or both. These constitute 17.8 per cent of approximately 6,000 physicians known to this Department. They number 9 more than the 1,058 who reported in 1932. Gonorrhea was reported by 824 (13.7 per cent) and syphilis by 428 (7.1 per cent) as compared to 14.1 per cent reporting gonorrhea and 7.4 per cent reporting syphilis in 1932. Of the 1,067 reporting, 281 had not reported either disease previously (26.3 per cent of those reporting). During the four years of reporting directly to the State Department of Public Health, 2,003 different physicians (approximately 33.3 per cent of all the physicians in the State) have reported either disease or both at one time or another. Since the Department has evidence that 50.1 per cent treat either gonorrhea or syphilis or both, it is apparent that reporting is by no means complete.

There was a decrease in cases of gonorrhea reported from 6,738 in 1932 to 6,591 in 1933, and a decrease in the number of cases of syphilis reported from 4,530 in 1932 to 4,466 in 1933 (Table XII). Cases of gonorrhea reported by clinics decreased by 42 over 1932; those reported by institutions decreased 132; while cases reported by physicians increased by 27. This is exactly the reverse of what occurred in 1932 when the increases were from clinics and institutions and the decrease was in reports from physicians. Cases of syphilis reported by clinics increased 88 over 1932; those reported by institutions decreased 199; while those reported by physicians increased by 49. In 1932 only physicians reported in decreasing numbers while in 1933 only institutions reported fewer cases. It is obvious from a comparison of reports from clinics with their monthly reports of admissions that clinics report most of their cases. Institutions on the whole report very poorly and physicians perhaps even less completely.

In April of 1933 a "Thank you" card was sent to all physicians in the State, as follows:

THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
cooperating with
THE UNITED STATES PUBLIC HEALTH SERVICE
Appreciates

The courtesy of the 1,792 physicians who have reported 14,250 cases of gonorrhea and syphilis during the last three years. If you treat either of these diseases, we trust we may continue to have your assistance in our efforts to study and plan a well balanced program for their control.

Our records show that you have reported cases as follows:

	1930	1931	1932
Gonorrhea	———	———	———
Syphilis	———	———	———

The result was rather surprising for whereas reports from physicians from January through April, inclusive, were the lowest on record since 1929, during the next seven months, from May through November, inclusive, they exceeded in number the reports received during any similar period since 1919. The stimulus lasted only about seven months, however, for there was marked evidence of neglect to report in December.

Physicians reported 48.4 per cent of the gonorrhea, clinics 43.6 per cent and institutions 8 per cent. Physicians reported 20.4 per cent of the syphilis, clinics 64.2 per cent and institutions 15.4 per cent.

There were 154 deaths from syphilis at a death rate per 100,000 population of 3.6. If deaths from general paralysis of the insane and tabes dorsalis are included, the total of deaths from syphilis was 334 at a rate of 7.7 per 100,000 population (Table XIII).

Of the 354 communities in the State, 101 reported no cases of either gonorrhea or syphilis as compared to 99 last year.

No new clinics for the treatment of gonorrhea or syphilis were opened during the year, nor were any of the old ones closed. Subsidy of the Lynn Clinic was renewed in December, when following a change in the health administration of that city, it was agreed that as soon as details could be worked out between the Lynn Department of Health and the Lynn Hospital, the clinic would be properly reorganized and equipped. The 14 clinics aided by this Department admitted 2,809 new cases of gonorrhea and 2,341 new cases of syphilis during the year, a total of 5,150 as compared to 4,894 in 1932. These admissions include nonresidents of the

State who not infrequently come to Massachusetts clinics for treatment but whose cases are not included in the statistics for this State. These patients made 228,440 visits, an increase of 11,287 over 1932, which indicates still further improvement in the attendance of those patients registered at the clinic. The total attendance at these 14 clinics was 13,481 different individuals.

The Brockton Hospital added a social worker to its personnel, in July of 1933, who assumes responsibility for social service in cancer, gonorrhea and syphilis. Since then the attendance at the clinic has practically doubled, and the Department has had to arrange for the follow-up only of the few lapsed cases who have residence in communities surrounding Brockton.

With the addition of social service to the staffs of the Lowell, Fall River and Brockton clinics during the past three or four years, clinic service has been very greatly improved. The Lowell Clinic regularly reports less than 5 per cent permanent lapses among its patients. Minimum standards for the management of gonorrhea and syphilis clinics were approved by the Public Health Council in February, 1933, and have been submitted to all the clinics in the State for their guidance.

In the fall of 1933 all the clinics in the State were advised to charge local boards of health for services rendered in treating patients who have gonorrhea or syphilis and who are unable to pay the relatively very small clinic fee. At the same time boards of health were reminded that the provision of this treatment for those unable to pay a physician is mandatory. There is constantly increasing evidence that a large number of boards of health are assuming this obligation, which should serve to relieve hospitals and clinics of an unfair economic burden. There is no reason why one community because it happens to be large enough to maintain such a clinic should bear the burden for a large number of smaller surrounding communities from which patients come into the larger one for treatment.

One hundred thirty-five boards of health followed 3,989 persons reported by name for having prematurely discontinued treatment or as alleged sources of infection. Forty-five per cent of these persons were found as compared to 41.8 per cent of 2,936 persons so reported last year. No final reports of the results of their investigations could be obtained from boards of health in 5.6 per cent of the cases. In Boston 36.7 per cent of 2,048 cases were located as compared to 36.7 per cent of 1920 cases last year.

Dr. Henry M. DeWolfe, Epidemiologist of the Subdivision, was available for visiting physicians only seven months of the year, having acted as a district health officer during the balance of the time.

The total distribution of arsenicals increased from 44,890 grams in 1932 to 49,403 grams in 1933. This increase rather contradicts our explanation of a decrease last year on the basis of a general tendency to use smaller doses. Distribution increased not only to physicians but to clinics and institutions as well. The 37,080 grams of neoarsphenamine distributed accounted for nearly 55 per cent of the total distribution of arsenicals. The distribution of sulpharsphenamine fell to a new low level of 4,340 grams as compared to 8,394 in 1932. Physicians received nearly 16 per cent of the total arsenicals distributed, and 354 different physicians used the State supply of arsenicals as compared to 289 last year.

The Wassermann Laboratory reported 106,193 blood and spinal fluid examinations for syphilis and the Bacteriological Laboratory reported 9,019 smears examined for gonorrhea.

During the year the staff of the Subdivision lectured to 45 different groups, chiefly professional, such as, nurses, medical students and physicians. In addition, many thousands of persons were reached by our Public Health Education Worker who, as full-time lecturer jointly for this Department and the Massachusetts Society for Social Hygiene, is constantly in the field.

During the year some 50,225 pieces of literature have been distributed by the Subdivision. One whole issue of The Commonhealth was devoted to the reprinting of a series of papers on "The Nurse in the Control of Gonorrhea and Syphilis", appearing originally in Public Health Nursing; a paper by Dr. Keidel of Johns Hopkins University on "Economic Aspects of the Management of Syphilis"; and "Four Radio Broadcasts" which had previously been given over Stations WBZ and WEEI. Another issue of Commonhealth carried a series of case histories as examples of the epidemiology of gonorrhea and syphilis, and still another issue of Commonhealth carried "The Difference Between Tweedledum and Tweedledee", the most recent broadcast on gonorrhea and syphilis over WEEI. All these papers were reprinted in large quantities for distribution to professional groups or to the public, according to their suitability.

Three ten-minute broadcasts were made over Station WEEI during the year, bringing the total to seven. One of the three was especially intended to call public attention to the picture, "Damaged Lives", which was shown, under the joint auspices of the American and Massachusetts Social Hygiene Societies, to over 100,000 people in Boston alone, and subsequently to other thousands in many Massachusetts communities.

Local Health Regulations

During 1932 a number of towns in Franklin County were persuaded to adopt uniform regulations pertaining to communicable diseases, thus avoiding the confusion that had existed because of the existence of different quarantine periods in adjoining communities. During the past year all but one of the remaining towns in this county have adopted similar regulations, the town of Shelburne being the only exception. Similarly, a number of the adjoining towns in Berkshire and Hampshire Counties have followed this excellent lead.

Lobar Pneumonia Study

The lobar pneumonia study which has been financed by the Commonwealth Fund of New York City, completed its third year. An appropriation has been made for its continuance for at least a fourth year, possibly for a fifth. The study was carried on under the same plan as in previous years. All of the areas which have been previously organized continued to use serum, and new areas were established in and around Clinton, Lawrence and Lowell.

One of the primary objects of the study was to determine the efficacy of the concentrated pneumonia serum under home and small hospital conditions. Heretofore its use had been very largely confined to a few large hospitals blessed with unusually complete equipment, where it was used by physicians specializing in pneumonia. These hospitals treat, however, a very small proportion of the cases of lobar pneumonia which might benefit from treatment. Consequently, if pneumonia serum was to be of any great practical use and an agent which a governmental body might justifiably distribute, it must be shown that it could be used by the average well trained general practitioner and used under home or small hospital conditions, for it is here that the bulk of the early cases of pneumonia are to be found. The results obtained so far during the study and reported at the meeting of the American Medical Association in June show that as great a reduction in mortality might be obtained under these conditions as was obtained in the hands of the specialists in the large hospitals.

The principal problem that now presents itself from the administrative standpoint is that of the development of a plan of serum distribution which will make the serum readily available for the treatment of those patients who may be expected to benefit from it and at the same time reducing to a minimum all wastage of serum in the treatment of unsuitable cases. What appears at the moment to be the best plan is the distribution of an average dose of serum on the basis of a laboratory report showing that a pneumococcus of Type I or II has been isolated from the sputum, the physician certifying that the patient is in the first four days of the illness. In order to determine the feasibility of this plan, the Newton Area was broadened out on this basis during the past fall and at the same time the serum was offered to physicians of Boston on the same basis.

It is still too early to determine the weaknesses of this distribution system, but the indications are that the basic idea is probably sound. The development of this will be one of the problems for the next two years so that if the State continues to distribute pneumonia serum at the end of that time, it will be possible to do so without needless waste of an extremely expensive product.

MILK

The past year, while marked by unusual unrest among the milk-producing interests due to economic considerations, has seen little change in the public health aspects of this subject. The discussion has centered largely around the question of the proper price to be paid the farmer for the milk. Although an adequate price is undoubtedly essential if the farmer is to take such precautions as may be necessary to safeguard the supply, this is essentially an economic question outside of the province of a health department. The health department enters only if in the course of the discussion there is any evidence that in the interests of economics the sanitary quality of the milk may be impaired. If due to the bitterness that exists between the milk producer and distributors the outcome of the economic discussion results in an increase in the raw milk that is sold, the health of the community will be definitely jeopardized. Although it is too early to draw any conclusions as to the outcome of the current discussion as to milk codes, it is somewhat disquieting to see little if any mention made of the sanitary and public health aspects of the question.

That a definite public health hazard exists due to the economic unrest is attested by the increase in the sale of raw milk in several communities. Because of the low price paid by the distributors who were pasteurizing their product, certain producers have resumed the distribution of raw milk. This has been the inevitable result in those communities that had failed to pass regulation restricting the sale of milk to that which has been pasteurized. Even more disquieting has been the backward step taken by the Malden Board of Health in giving up their protection coming from universal pasteurization to permit the sale of raw milk from a local dairy. It is discouraging to see the public ignore the lessons of the past. Even more discouraging, however, is such a step on the part of a board entrusted with the responsibility for the health of the community but failing to heed the oft-repeated lesson that raw milk, no matter how clean or how fresh today, may be tomorrow the source of a devastating outbreak of disease. An adult notes with condescension that an infant must burn its fingers before it realizes that the stove is hot. How much farther advanced is the health authority that must experience the burn of a milk-borne epidemic before it will learn the menace of raw milk.

Two outbreaks of milk-borne disease, each spread by raw milk, occurred during the past year. A Hingham dairy selling raw milk in Hingham, Weymouth and Quincy was responsible for 43 cases and 2 deaths. Many of the cases presented typical pictures of scarlet fever, others were characteristically septic sore throat, while two cases presented a typical picture of erysipelas. Because of these divergent clinical pictures, all known to be associated with hemolytic streptococci, it seems only fair to consider the epidemic as one of streptococcal infections. This outbreak renews the question as to the inter-relationship of the streptococcal infections. The outbreak is likewise instructive in that the bacterial counts of this milk in Quincy had always been among the lowest of any milk there sold. An udder infected with hemolytic streptococci was apparently the source of the infection.

Another outbreak of similar character appearing as scarlet fever in some patients and septic sore throat in others occurred in East Bridgewater. Here again raw milk was the vehicle for spread and an infection of the udder was the apparent cause. Certainly these types of infections will always occur so long as raw milk is sold. In each instance, however, the milk-borne outbreak was merely the spark which set off a rather widespread outbreak of scarlet fever throughout the community.

DISTRICT HEALTH UNITS

The past year has seen a growth of and an increasing appreciation for the three District Health Units which are now in operation. Although there have been some suggestions as to interest in similar units elsewhere, it is probably inadvisable to attempt such until there is more evidence of local take-over of the present units. Furthermore, owing to the present economic situation, it would be absolutely impossible at present to obtain a subsidy for these from any of the several Foundations which have been interested in this type of project.

(1) *Cape Cod Health Bureau.* This county health department, the first one established in New England, has been subsidized for some years by the United States

Public Health Service. During the past year, owing to the necessity for governmental retrenchment, the small remaining subsidy was entirely withdrawn. This loss in income was, however, made up immediately by an increased appropriation by the County Commissioners so that this unit is at present entirely self-supporting. This willingness on the part of the local authorities to assume this added obligation is a striking evidence of the appreciation for the work which has been done. During the year, through the generosity of the Commonwealth Fund, the Assistant Milk Inspector of this area was given a four weeks' course in milk bacteriology. While this area has been one of the leaders in milk sanitation so far as concerns the tuberculin testing of the cattle and sanitary conditions of the dairy farms, it has been backward in that no provision has been made for bacteriological supervision. It was hoped that with this added incentive, bacteriological supervision might be added to round out what is otherwise an excellent milk sanitation program. Unfortunately, no provision has as yet been made to capitalize upon this added training.

(2) *Southern Berkshire Health Unit.* This health district, begun in February, 1931, and subsidized by the Commonwealth Fund of New York City, has seen little change during the past year, the energies being devoted toward the development of a public understanding of the work carried on. The coördination of the nursing program with that of the visiting nursing associations has continued and has added strength to both parties, resulting in a more uniform and rounded nursing program in those communities which it has served. The outstanding development during the year has been the establishment of a tuberculosis consultation clinic under auspices of the Unit, held at the Fairview Hospital in Great Barrington and staffed from the Westfield State Hospital. The cordial support given this clinic and the extent of its utilization are striking proof of the need that it has met. The outstanding problem at present in this area is that of developing local support to the point where the Unit can eventually be taken over as the Commonwealth Fund withdraws its subsidy. As the year closes plans are being made to submit the project to the 1934 town meetings in the hopes of legally forming a Union Health District, as provided by Chapter 209 of the Acts of 1932. Under such a plan one-third of the expense of the Unit would be borne by the cooperating communities in the year 1935, an extra third in 1936, with complete take-over in 1937, when the Commonwealth Fund plans to withdraw from the project.

(3) *Nashoba Health Unit.* This district, likewise subsidized by the Commonwealth Fund of New York City, has seen a more gradual development, due in large part to changes in personnel. Dr. James O. Wails succeeded Dr. Reeves as Medical Director on June 1st. With the departure of Miss Seeley, the Advisory Nurse, this position was filled for a time by Miss Donovan of the Department staff until Miss Northrup, formerly Field Supervisor of the Great Barrington Visiting Nurse Association, assumed this position as of November 1st. This change in personnel has of necessity slowed up the work, but unquestionably means a far sounder organization. Mr. Eugene Barry of Ayer, who had rendered such a service to the community and had given unsparingly of his time in the establishment of the Unit, felt the necessity of withdrawing as President of the Association and has been succeeded by Dr. Edward Branigan of Groton. In this area as in the Southern Berkshires the groundwork of the organization is well established so that a very satisfactory health program is under way. The principal problem that presents itself is that of developing local appreciation and understanding to the end that the Unit may be taken over by the several cooperating communities when the Commonwealth Fund withdraws. Contrary to the plan in the Berkshires, the question will not be submitted to town meeting this year as it is necessary first to make certain adjustments of the nursing situation in some communities which will put the several towns on a comparable basis. The coming year must therefore be spent in promotional work looking forward to the formation of a Union Health District in 1935.

District Health Officers

The District Health Officers, working under the Division of Communicable Diseases though representing the entire Department, have continued to carry out faithfully the duties required of them by statute, including jail and hospital inspections. Their efforts have been devoted largely, however, toward promotional work with the several boards of health within their district, notably along the lines of diphtheria immunization, more adequate case finding of tuberculosis, and other problems dealing specifically with communicable diseases. The high number of typhoid carriers discovered during the year is striking evidence of the thoroughness with which cases of typhoid fever have been followed.

BACTERIOLOGICAL LABORATORY

The Bacteriological Laboratory has for the past year borne a somewhat increased load as compared with 1932. The actual increase in the load cannot, however, be measured solely in terms of the number of specimens examined, as the increase has been largely among those which require the greatest amount of time. The striking decrease in the number of specimens submitted for diphtheria examination is the natural result of the lessened prevalence of this disease. This decreased prevalence has also meant fewer instances of wholesale culturing of schools, which had put a considerable burden on the laboratory without adding much if anything to control measures. This decrease has, however, been more than counterbalanced by a very marked increase in the number of typhoid stool specimens submitted, and miscellaneous examinations have also increased markedly.

Two very troublesome problems in connection with organisms of the paratyphoid and dysentery groups have been brought to the front during the year. As in previous years, the laboratory has discovered in connection with food poisoning outbreaks, organisms which were chemically of the paratyphoid B. group but which have failed to agglutinate with any known serum. Their pathogenicity is open to considerable doubt, particularly in view of the fact that other laboratories have found them rather frequently in routine examination of food handlers without any clinical evidence that these food handlers were responsible for any cases of so-called food poisoning. Just as perplexing are the organisms which chemically resemble dysentery, though likewise fail to agglutinate with any known serum. Their occasional discovery in connection with an outbreak of gastro-enteritis raises a natural question as to their pathogenicity. Yet their frequent isolation, independent of such outbreaks, may well cast doubt on their importance. This would seem to be a field in which further study is necessary before any intelligent administrative policy can be developed.

The pneumonia typing work has increased during the year owing to an increased utilization of the laboratory, to the development of additional pneumonia areas, and the increased prevalence of pneumonia during the last half of the year. The utilization of the Neufeld method of typing has been the outstanding event of the year so far as concerns the Diagnostic Laboratory. Through the use of this method it has been possible to determine the type accurately within fifteen or twenty minutes in the majority of the Type I and Type II cases, whereas formerly with the Sabin method three or four hours was the minimum. Although this method is still being carefully checked through the Sabin and tube agglutination methods, the evidence as to the reliability of this is increasing. It seems, therefore, that we may in the not too distant future look forward to the day when this method may, whenever a positive result is found, supplant all other methods. This would mean a considerable saving of time so far as concerns the reporting of the results and would also mean a considerable saving of time and effort on the part of the laboratory staff. This is particularly important in view of the fact that ultimately with the withdrawal of the financial support from the Commonwealth Fund the State must plan to take over the financial burden that comes from the additional pneumonia work. By that time, however, it is to be hoped that the methods of typing will have been so clarified that much of the routine cross-checking can be eliminated.

A change in the gonorrhea outfit whereby only one slide is used has somewhat reduced the work of the laboratory in connection with these specimens. It is still possible through carefully following the directions included in the outfit to place on a single slide smears from two different parts of the body. Under the old form of two slides designed for this purpose, in many instances both were used for material from the same lesion, so that a duplication of examinations was inevitable. Through this change many of these duplicate examinations have been eliminated and at the same time there has been no sacrifice of efficiency.

The only other change in laboratory procedure has been the beginning of cultural work in connection with tuberculous fluids, using the Petragagni medium and the

Petroff medium. This work is still in its early stages and is being carefully checked with the animal inoculations which have heretofore been our sole reliance.

PUBLIC HEALTH EDUCATION

During the past year speakers in the Division gave 53 talks, exclusive of those referred to under Gonorrhea and Syphilis. Over 4,300 people were reached. In addition, eight radio talks were given over station WEEI and one over WBZ.

TABLE I. — *Anterior Poliomyelitis*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1929	119	2.8	21	.5	17.6
1930	503	11.8	35	.8	7.0
1931	1,428	33.4	114	2.7	8.0
1932	61	1.4	13	.3	21.3
1933	353	8.2	32	.7	9.1

TABLE II. — *Diphtheria*

1929	4,255	100.5	256	6.0	6.0
1930	3,322	78.1	182	4.3	5.5
1931	2,381	55.7	130	3.0	5.4
1932	1,811	42.1	107	2.5	5.9
1933	1,041	24.1	86	2.0	8.3

TABLE III. — *Epidemic Cerebrospinal Meningitis*

1929	167	3.9	79	1.9	47.3
1930	174	4.1	59	1.4	33.9
1931	101	2.4	30	.7	29.7
1932	83	1.9	34	.8	41.0
1933	50	1.2	25	.6	50.0

TABLE IV. — *Lobar Pneumonia*

1929	5,287	124.9	2,202	52.0	41.6
1930	4,333	101.8	1,883	44.3	43.5
1931	3,873	90.6	1,718	40.2	44.4
1932	4,028	93.7	1,688	39.3	41.9
1933	4,277	99.0	1,825	42.3	42.7

TABLE V. — *Measles*

1929	14,925	352.5	121	2.9	.8
1930	27,137	637.8	137	3.2	.5
1931	16,581	387.8	64	1.5	.4
1932	19,763	459.9	64	1.5	.3
1933	15,067	348.9	27	.6	.2

TABLE VI. — *Scarlet Fever*

1929	9,975	235.6	71	1.7	.7
1930	9,408	221.1	98	2.3	1.0
1931	12,782	298.9	101	2.4	.8
1932	16,580	385.8	145	3.4	.9
1933	12,284	284.5	108	2.5	.9

TABLE VII. — *Smallpox*

1929	273		1		
1930	2		–		
1931	6		–		
1932	43		–		
1933	–		–		

TABLE VIII. — *Tuberculosis, Pulmonary*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1929	4,538	107.2	2,561	60.5	
1930	4,696	110.4	2,423	56.9	
1931	4,421	103.4	2,306	53.9	
1932	3,994	92.9	2,041	47.5	
1933	3,541	82.0	2,059	47.7	

TABLE IX. — *Tuberculosis, Non-Pulmonary*

1929	649	15.3	361	8.5	
1930	587	13.8	311	7.3	
1931	555	13.0	248	5.8	
1932	466	10.8	260	6.1	
1933	466	10.8	222	5.1	

TABLE X. — *Typhoid Fever*

1929	307	7.3	42	.99	13.7
1930	318	7.5	38	.89	11.9
1931	250	5.8	30	.70	12.0
1932	214	5.0	25	.58	11.7
1933	162	3.8	22	.50	13.6

TABLE XI. — *Whooping Cough*

1929	7,708	182.1	137	3.2	1.8
1930	10,750	252.6	182	4.3	1.7
1931	7,174	167.8	88	2.1	1.2
1932	7,881	183.4	107	2.5	1.4
1933	9,834	227.7	97	2.2	1.0

TABLE XII. — *Gonorrhea and Syphilis*

YEAR	GONORRHEA		SYPHILIS			
	Cases	Case Rate per 100,000	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000
1929	4,410	104.2	1,531	36.2	133	3.1
*1930	6,974	163.9	4,197	98.6	149	3.5
1931	7,201	168.4	4,447	104.0	168	3.9
1932	6,738	157.0	4,530	105.4	162	3.8
1933	6,591	152.6	4,466	103.4	154	3.6

*All forms made reportable to State Department of Public Health.

TABLE XIII. — *General Paralysis of the Insane*

YEAR	DEATHS		FIRST ADMISSIONS TO STATE INSTITUTIONS FOR MENTAL DISEASES		
	Deaths	Death Rate per 100,000	First Admissions	Rate per 100,000	Per Cent of All First Admissions
1929	186	4.2	226	5.2	7.4
1930	168	3.9	227	5.3	7.2
1931	166	3.9	203	4.8	6.4
1932	166	3.9	206	4.8	6.6
1933	147	3.4	209	4.8	6.5

TABLE XIV. — *Gonorrhea and Syphilis Treated in Clinics and Institutions.*

Clinics

YEAR	NEW CASES		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1929	2,452	2,609	194,262	25
1930	2,747	2,968	217,452	25
1931	3,040	2,631	206,433	25
1932	2,978	2,876	249,263	26
1933	3,117	3,063	261,867	26

Institutions

YEAR	NEW CASES		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1929	344	660	–	27
1930	356	723	–	25
1931	436	823	–	24
1932	522	987	–	24
1933	464	946	–	24

TABLE XV. — *Grams of Arsphenamine, Sulpharsphenamine and Neoarsphenamine Distributed.*

YEAR	Arsphenamine	Sulpharsphenamine	Neoarsphenamine	Total
1929	8,753	17,634	18,146	44,533
1930	9,802	12,915	22,284	45,001
1931	9,235	13,676	26,987	49,898
1932	8,681	8,394	27,815	44,890
1933	7,984	4,339	37,080	49,403

TABLE XVI.—*Grams of Arsenicals Distributed to Clinics, Institutions and Physicians*

YEAR	Clinics and Institutions	Physicians
1929	36,893	7,640
1930	36,103	8,898
1931	40,714	9,183
1932	36,903	6,987
1933	41,549	7,854

TABLE XVII.—*Laboratory Examinations*—1932

	Positive	Negative	Total for 1933	Total for 1932
Diphtheria:				
Diagnosis	284	6,979	7,263	7,043
Release	526	1,033	1,559	3,304
Tuberculosis:				
Sputum	725	4,312	5,037	5,000
Animal inoculations	16	180	196	184
Typhoid fever:				
Widal	135	2,008	2,237*	1,845**
Culture (blood, feces, urine, etc.) .	168	3,692	3,860	2,374
Gonorrhea	1,756	7,263	9,019	9,105
Malaria	2	51	53	42
Miscellaneous:				
Pneumococcus type determinations .	–	–	1,314	1,132
Hemolytic streptococci	–	–	1,353	1,435
Spinal fluid for meningococci . . .	–	–	4	16
Undulant fever	36	338	374	339
Unclassified	–	–	1,213	962
Total			33,482	32,781

*Includes 94 atypical.
**Includes 53 atypical.

TABLE XVIII. — *Laboratory Examinations for Rabies**

YEARS	Positive		Negative	Total Animals Examined
	Dogs	Other Animals		
1929	316	5	134	455
1930	292	18	161	471
1931	290	14	211	515
1932	125	6	130	265
1933	139	5	153	301

*Wassermann Laboratory

Cases and Deaths, with Case and Death Rates per 100,000 Population for Reportable Diseases During the Year 1933*

DISEASES	Cases	Case Rate per 100,000 Population	Deaths	Death Rate per 100,000 Population	Fatality Rate (Per Cent)
Actinomycosis	3	.07	2	.05	66.7
Anterior Poliomyelitis	353	8.2	32	.7	9.1
Anthrax	9	.2	2	.05	22.2
Chicken Pox	10,259	237.6	8	.2	.08
Diphtheria	1,041	24.1	86	2.0	8.3
Dog Bite	6,125	141.8	–	–	–
Dysentery, Amebic	23	.5	2	.05	8.7
Dysentery, Bacillary	17	.4	3	.07	17.6
Encephalitis Lethargica	27	.6	16	.4	59.3
Epidemic Cerebrospinal Meningitis	50	1.2	25	.6	50.0
German Measles	548	12.7	–	–	–
Gonorrhea	6,591	152.6	7	.2	
Lobar Pneumonia	4,277	99.0	1,825	42.3	42.7
Malaria	28	.6	2	.05	7.1
Measles	15,067	348.9	27	.6	.2
Mumps	5,857	135.6	4	.09	.07
Ophthalmia Neonatorum	1,018	23.6	–	–	–
Paratyphoid Fever	10	.2	2	.05	20.0
Pellagra	4	**	10	.2	–
Rabies	1	.02	1	.02	100.0
Scarlet Fever	12,284	284.5	108	2.5	.9
Septic Sore Throat	206	4.8	43	1.0	20.9
Smallpox	–	–	–	–	–
Syphilis	4,466	103.4	154	3.6	
Tetanus	19	.4	20	.5	
Trachoma	32	.7	–	–	–
Trichinosis	41	.9	2	.05	4.9
Tuberculosis, Pulmonary	3,541	82.0	2,059	47.7	
Tuberculosis, Other Forms	466	10.8	222	5.1	
Tuberculosis, Hilum	917	21.2	–	–	–
Typhoid Fever	162	3.8	22	.5	13.6
Typhus Fever	1	.02	–	–	–
Undulant Fever	11	.3	–	–	–
Whooping Cough	9,834	227.7	97	2.2	1.0
Total	83,288	1,928.7	4,781	110.7	

*Population — 4,318,130
**Incompletely reported.

MASSACHUSETTS STATISTICS FOR 1933

Population (Estimated as of July 1, 1933)	4,318,130
Death rate per 1,000 population	11.8
Infant mortality (per 1,000 live births)	51.9

Cases and Deaths for all Reportable Diseases by Months—1933

	JAN.		FEB.		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Actinomycosis	–	1	–	–	2	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	2
Anterior Poliomyelitis	1	–	1	–	1	–	–	–	5	–	3	1	78	6	148	14	83	9	23	1	6	–	4	1	353	32
Anthrax	–	–	3	2	2	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	2	–	9	2
Chicken Pox	1715	–	1106	2	1505	2	1209	–	1090	–	1006	2	342	1	125	–	81	–	280	–	772	–	1028	1	10259	8
Diphtheria	134	14	91	10	86	4	77	3	86	4	81	7	66	7	63	7	58	7	107	8	98	10	94	5	1041	86
Dog Bite	299	–	318	–	388	–	586	–	712	–	803	–	733	–	622	–	575	–	457	–	332	–	300	–	6125	–
Dysentery, Amebic	1	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	–	10	1	9	1	23	2
Dysentery, Bacillary	–	–	–	–	1	–	4	–	–	–	1	–	–	–	3	1	5	–	1	–	2	1	–	1	17	3
Encephalitis Lethargica	1	1	4	2	–	–	–	2	3	1	4	2	4	2	3	1	–	1	4	1	3	2	1	1	27	16
Epidemic Cerebrospinal Meningitis	9	6	1	1	2	1	6	2	5	2	1	2	8	4	7	2	1	–	2	2	4	–	4	3	50	25
German Measles	27	–	51	–	46	–	92	–	107	–	85	–	35	–	25	–	10	–	12	–	28	–	30	–	548	–
Gonorrhea	465	–	427	–	476	1	388	–	454	–	655	–	580	1	664	1	648	1	670	1	571	1	593	1	6591	7
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lobar Pneumonia	919	413	466	187	418	179	339	160	285	124	189	73	108	58	96	46	82	40	201	103	434	185	740	257	4277	1825
Malaria	2	–	2	–	1	1	–	–	1	–	1	1	3	–	4	–	4	–	4	–	4	–	2	–	28	2
Measles	601	1	982	3	1547	5	1974	3	2466	3	2419	3	1164	1	240	2	79	–	259	1	1085	1	2251	4	15067	27
Mumps	750	–	718	–	1098	1	786	–	779	–	534	1	208	–	103	–	98	–	163	1	253	1	367	–	5857	4
Ophthalmia Neonatorum	122	–	44	–	103	–	152	–	105	–	93	–	67	–	27	–	127	–	77	–	36	–	65	–	1018	–
Paratyphoid Fever	–	–	–	–	1	–	1	1	2	–	–	–	1	1	2	–	3	–	–	–	–	–	–	–	10	2
Pellagra	–	–	1	–	–	–	–	–	–	2	1	2	1	2	1	1	–	–	–	2	–	–	–	1	4	10
Rabies	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	1	1
Scarlet Fever	1659	19	1499	15	1912	13	1644	11	1521	15	1018	4	418	3	271	4	292	1	513	5	694	7	843	11	12284	108
Septic Sore Throat	10	–	40	3	28	4	15	4	17	1	13	7	17	4	18	7	9	1	5	1	19	10	15	1	206	43
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	392	13	340	12	364	6	339	19	422	7	439	19	348	18	336	10	362	14	367	12	385	9	372	15	4466	154
Tetanus	2	1	–	1	–	1	–	–	1	1	2	3	4	5	3	4	5	2	1	2	–	–	1	–	19	20
Trachoma	5	–	4	–	1	–	5	–	1	–	3	–	4	–	2	–	2	–	2	–	1	–	2	–	32	–
Trichinosis	–	–	21	1	1	–	1	–	–	–	4	–	–	–	2	–	–	–	7	–	4	–	1	1	41	2
Tuberculosis, Pulmonary	270	223	213	137	353	191	307	189	338	175	317	171	318	184	363	158	257	155	255	162	295	164	255	150	3541	2059
Tuberculosis, Other Forms	31	16	35	22	45	27	39	27	55	15	38	16	50	14	42	22	31	12	40	18	31	16	29	17	466	222
Tuberculosis, Hilum	77	–	28	–	37	–	34	–	70	–	230	–	178	–	40	–	30	–	61	–	75	–	57	–	917	–
Typhoid Fever	11	1	4	2	8	1	12	3	14	–	8	4	20	3	25	1	23	2	19	2	4	1	14	2	162	22
Typhus Fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–
Undulant Fever	–	–	–	–	–	–	2	–	1	–	2	–	1	–	2	–	–	–	–	–	2	–	1	–	11	–
Whooping Cough	739	7	732	6	1135	10	840	5	710	3	715	5	654	12	686	13	500	9	671	9	1308	9	1144	9	9834	97
Total	8242	716	7131	406	9561	448	8854	429	9252	353	8666	323	5410	326	3923	294	3366	255	4202	331	6456	418	8225	482	83288	4781

Cases of Reportable Diseases for 1933 by Ages

DISEASE	Under 1 Year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	Age Unknown	Total	Male	Female	Unknown
Anterior Poliomyelitis	8	21	24	21	19	26	36	27	19	18	60	23	13	11	5	9	1	–	–	–	12	353	199	154	–
Chicken Pox	286	399	524	608	742	1223	1911	1341	937	471	850	136	55	57	38	23	8	4	1	–	645	10259	5268	4894	97
Diphtheria	27	46	67	78	78	78	78	70	55	35	151	52	38	34	23	34	15	6	2	–	74	1041	540	501	
Dysentery:																									–
Amebic	–	–	–	–	–	–	–	–	–	–	1	1	–	2	3	9	4	–	–	–	3	23	18	5	–
Bacillary	–	–	1	–	2	–	–	1	1	–	2	–	1	–	1	2	2	–	1	–	3	17	9	8	–
Not stated	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Epidemic Cerebrospinal Meningitis	11	1	1	2	1	1	5	–	–	2	5	2	6	3	–	3	3	1	–	–	3	50	26	24	–
German Measles	47	54	44	34	32	35	56	35	41	28	54	23	13	6	–	4	2	–	–	–	40	548	269	277	2
Gonorrhea	26	2	4	25	13	14	19	13	27	13	44	688	2007	1501	933	849	247	92	15	3	56	6591	4998	1593	–
Hookworm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lobar Pneumonia	112	123	79	88	92	112	112	100	98	69	277	213	198	203	237	564	442	443	321	195	199	4277	2408	1863	6
Malaria	–	–	1	–	–	–	–	–	–	–	–	2	2	1	2	5	3	1	1	–	10	28	18	10	–
Measles	341	694	904	1010	1333	1873	2555	2104	1310	680	994	175	76	41	22	21	5	7	1	1	920	15067	7614	7333	120
Mumps	25	60	125	170	259	422	803	713	581	417	1140	267	98	100	88	112	26	16	3	1	431	5857	3127	2652	78
Paratyphoid Fever	1	–	–	–	1	–	–	1	–	–	2	1	1	2	–	–	–	–	–	–	1	10	6	3	1
Pellagra	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	1	1	–	–	–	–	4	2	2	–
Scarlet Fever	65	209	581	797	899	1005	1321	1161	970	844	2236	622	326	228	210	226	79	13	2	1	489	12284	6010	6231	43
Septic Sore Throat	2	3	6	1	4	7	3	5	1	6	12	16	24	15	19	26	26	7	5	1	17	206	84	122	–
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	36	8	4	5	5	11	14	20	8	12	84	239	556	614	505	1015	778	391	130	20	11	4466	2577	1889	–
Trachoma	–	–	–	–	–	–	–	–	–	–	3	2	1	–	2	11	7	3	1	–	2	32	21	11	–
Tuberculosis, Pulmonary	8	11	10	11	13	15	14	18	17	15	98	283	461	437	343	585	457	246	124	27	348	3541	1950	1591	–
Tuberculosis, Other Forms	13	18	18	10	11	8	11	12	12	10	37	47	49	30	22	62	23	28	7	2	36	466	238	225	3
Typhoid Fever	2	–	1	–	1	3	5	5	6	4	23	23	17	13	11	23	14	9	–	–	2	162	89	73	–
Typhus Fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	1	–
Undulant Fever	–	–	–	–	–	–	–	–	–	–	–	–	1	3	1	3	–	2	–	–	1	11	7	4	–
Whooping Cough	711	775	902	1062	1075	1217	1394	860	517	257	291	34	11	11	22	23	9	1	2	3	657	9834	4744	5037	53

Index to Line Numbers in the Table of Cases of Diseases Dangerous to the Public Health, 1933

Abington	114
Acton	181
Acushnet	136
Adams	66
Agawam	91
Alford	345
Amesbury	65
Amherst	115
Andover	77
Arlington	25
Ashburnham	204
Ashby	275
Ashfield	287
Ashland	190
Athol	69
Attleboro	38
Auburn	103
Avon	184
Ayer	163
Barnstable	87
Barre	146
Becket	302
Bedford	157
Belchertown	158
Bellingham	154
Belmont	32
Berkley	266
Berlin	270
Bernardston	283
Beverly	31
Billerica	107
Blackstone	129
Blandford	301
Bolton	292
Boston	2
Bourne	171
Boxborough	331
Boxford	298
Boylston	261
Braintree	48
Brewster	291
Bridgewater	81
Brimfield	284
Brockton	15
Brookfield	252
Brookline	20
Buckland	245
Burlington	211
Cambridge	5
Canton	117
Carlisle	303
Carver	247
Charlemont	288
Charlton	200
Chatham	202
Chelmsford	94
Chelsea	23
Cheshire	232
Chester	246
Chesterfield	315
Chicopee	22
Chilmark	338
Clarksburg	250
Clinton	68
Cohasset	160
Colrain	255
Concord	90
Conway	285
Cummington	306
Dalton	133
Dana	314
Danvers	59
Dartmouth	84
Dedham	52
Deerfield	170
Dennis	212
Dighton	162
Douglas	198
Dover	254
Dracut	96
Dudley	138
Dunstable	313
Duxbury	221
East Bridgewater	147
East Brookfield	282
East Longmeadow	151
Eastham	304
Easthampton	71
Easton	123
Edgartown	253
Egremont	307
Enfield	326
Erving	258
Essex	240
Everett	18
Fairhaven	72
Fall River	8
Falmouth	126
Fitchburg	28
Florida	334
Foxborough	120
Framingham	37
Franklin	101
Freetown	227
Gardner	45
Gay Head	347
Georgetown	214
Gill	276
Gloucester	34
Goshen	340
Gosnold	351
Grafton	99
Granby	280
Granville	294
Great Barrington	119
Greenfield	53
Greenwich	353
Groton	185
Groveland	191
Hadley	180
Halifax	289
Hamilton	201
Hampden	293
Hancock	335
Hanover	169
Hanson	194
Hardwick	199
Harvard	277
Harwich	182
Hatfield	189
Haverhill	21
Hawley	333
Heath	324
Hingham	102
Hinsdale	260
Holbrook	153
Holden	135
Holland	348
Holliston	167
Holyoke	17
Hopedale	168
Hopkinton	179
Hubbardston	278
Hudson	82
Hull	226
Huntington	272
Ipswich	122
Kingston	173
Lakeville	228
Lancaster	164
Lanesborough	262
Lawrence	12
Lee	137
Leicester	128
Lenox	177
Leominster	40
Leverett	299
Lexington	74
Leyden	337
Lincoln	231
Littleton	243
Longmeadow	124
Lowell	10
Ludlow	80
Lunenburg	206
Lynn	9
Lynnfield	216
Malden	16
Manchester	174
Mansfield	110
Marblehead	79
Marion	213
Marlborough	55
Marshfield	238
Mashpee	317
Mattapoisett	244
Maynard	105
Medfield	134
Medford	14
Medway	161
Melrose	33
Mendon	264
Merrimac	187
Methuen	41
Middleborough	86
Middlefield	346
Middleton	217
Milford	57
Millbury	95
Millis	220
Millville	207
Milton	46
Monroe	336
Monson	127
Montague	88
Monterey	330
Montgomery	350
Mount Washington	355
Nahant	224
Nantucket	140
Natick	58
Needham	67
New Ashford	354
New Bedford	6
New Braintree	316
New Marlborough	290
New Salem	320
Newbury	233
Newburyport	56
Newton	13
Norfolk	235
North Adams	42
North Andover	100
North Attleborough	76
North Brookfield	166
North Reading	197
Northampton	35
Northborough	209
Northbridge	78
Northfield	210
Norton	175
Norwell	236
Norwood	54
Oak Bluffs	249
Oakham	311
Orange	121
Orleans	256
Otis	323
Oxford	141
Palmer	83
Paxton	295
Peabody	39
Pelham	312
Pembroke	241
Pepperell	165
Peru	352
Petersham	300
Phillipston	325
Pittsfield	19
Plainfield	328
Plainville	229
Plymouth	63
Plympton	310
Princeton	296
Provincetown	144

Quincy	11
Randolph	98
Raynham	195
Reading	75
Rehoboth	172
Revere	29
Richmond	305
Rochester	263
Rockland	97
Rockport	152
Rowe	332
Rowley	251
Royalston	297
Russell	265
Rutland	178
Salem	24
Salisbury	186
Sandisfield	321
Sandwich	248
Saugus	51
Savoy	339
Scituate	156
Seekonk	125
Sharon	150
Sheffield	223
Shelburne	237
Sherborn	279
Shirley	183
Shrewsbury	92
Shutesbury	342
Somerset	116
Somerville	7
South Hadley	104
Southampton	281
Southborough	193
Southbridge	60
Southwick	234
Spencer	112
Springfield	4
Sterling	242
Stockbridge	219
Stoneham	73
Stoughton	85
Stow	267
Sturbridge	218
Sudbury	273
Sunderland	268
Sutton	196
Swampscott	70
Swansea	131
Taunton	30
Templeton	139
Tewksbury	113
Tisbury	230
Tolland	349
Topsfield	274
Townsend	225
Truro	309
Tyngsborough	239
Tyringham	343
Upton	203
Uxbridge	109
Wakefield	50
Wales	329
Walpole	89
Waltham	26
Ware	106
Wareham	118
Warren	145
Warwick	322
Washington	344
Watertown	27
Wayland	155
Webster	64
Wellesley	62
Wellfleet	286
Wendell	327
Wenham	259
West Boylston	192
West Bridgewater	159
West Brookfield	257
West Newbury	222
West Springfield	47
West Stockbridge	271
West Tisbury	341
Westborough	108
Westfield	44
Westford	148
Westhampton	318
Westminster	208
Weston	149
Westport	130
Westwood	188
Weymouth	36
Whately	269
Whitman	93
Wilbraham	176
Williamsburg	215
Williamstown	142
Wilmington	132
Winchendon	111
Winchester	61
Windsor	319
Winthrop	49
Woburn	43
Worcester	3
Worthington	308
Wrentham	143
Yarmouth	205
Tewksbury State Infirmary	356
Out of State	357

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Population estimated as of July 1, 1933	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
1	Massachusetts	4,318,130	3	353	9	10259	1041	6125	23	17	27	50	548	6591
	CITIES OF OVER 500,000													
2	Boston	782,205	1	102	–	2800	207	2100	2	1	2	10	162	2363
	CITIES OF OVER 150,000	*353,240*	–	*30*	–	*979*	*63*	*568*	*3*	–	*1*	–	*64*	*559*
3	Worcester	198,270	–	27	–	593	54	315	3	–	1	–	51	215
4	Springfield	154,970	–	3	-	386	9	253	–	–	–	–	13	344
	CITIES OF 100,000–150,000	*533,118*	*1*	*38*	*4*	*1388*	*248*	*797*	-	*2*	*2*	*7*	*65*	*806*
5	Cambridge	109,728	–	8	–	738	50	366	–	1	–	3	29	236
6	New Bedford	108,112	1	2	–	119	73	62	–	–	–	3	6	209
7	Somerville	107,067	-	19	–	96	63	107	–	–	–	1	5	124
8	Fall River	106,382	–	5	–	112	34	118	–	–	–	–	17	114
9	Lynn	101,829	–	4	4	323	28	144	–	1	2	–	8	123
	CITIES AND TOWNS OF 50,000–100,000	*727,402*	–	*42*	-	*1177*	*200*	*768*	*4*	–	*5*	*6*	*68*	*1003*
10	Lowell	93,733	–	2	–	37	71	149	–	–	–	1	6	241
11	Quincy	79,730	–	9	–	262	25	72	1	–	1	1	13	77
12	Lawrence	79,614	–	2	–	24	3	73	–	–	1	–	1	162
13	Newton	73,215	–	3	-	229	13	65	–	–	–	–	15	65
14	Medford	67,550	–	6	–	137	41	121	1	–	1	–	10	83
15	Brockton	62,796	–	3	-	152	15	47	–	–	–	1	7	66
16	Malden	62,080	–	7	–	48	11	104	–	–	–	1	6	74
17	Holyoke	54,070	–	1	–	83	3	40	–	–	–	1	7	42
18	Everett	52,515	-	5	-	52	15	30	–	–	1	–	–	71
19	Pittsfield	51,486	–	2	–	15	2	30	–	–	1	–	–	74
20	Brookline	50.613	–	2	–	138	1	37	2	–	–	1	3	48
	CITIES AND TOWNS OF 25,000-50,000	*498,644*	–	*38*	*1*	*895*	*103*	*644*	*7*	*2*	*2*	*7*	*71*	*659*
21	Haverhill	48,372	–	3	1	124	12	63	–	–	–	1	1	99
22	Chicopee	45,255	–	1	–	10	3	42	–	–	–	2	–	40
23	Chelsea	44,890	–	2	–	51	16	66	1	1	1	1	3	107
24	Salem	43,695	–	3	–	9	18	6	–	–	–	1	3	51
25	Arlington	43,335	–	4	–	93	9	72	–	–	–	–	9	34
26	Waltham	42,171	–	–	–	98	4	72	–	–	–	–	1	35
27	Watertown	41,040	–	5	–	162	9	103	–	–	–	–	18	67
28	Fitchburg	38,798	–	2	–	26	2	17	–	–	–	–	11	25
29	Revere	37,245	–	6	-	126	11	52	–	–	–	–	–	80
30	Taunton	36,123	–	1	–	19	16	21	–	1	–	1	–	27
31	Beverly	26,645	–	10	–	31	1	42	6	–	–	–	2	27
32	Belmont	25,955	–	1	–	114	2	67	–	–	1	–	21	31
33	Melrose	25,120	–	–	–	22	–	21	–	–	–	1	2	36
	CITIES AND TOWNS OF 10,000-25,000	*688,465*	-	*61*	*4*	*1692*	*96*	*658*	*2*	*11*	*5*	*13*	*50*	*592*
34	Gloucester	24,735	-	2	–	13	3	34	–	–	–		1	25
35	Northampton	24,530	–	1	–	88	2	36	-	–	1	1	3	31
36	Weymouth	23,235	-	2	–	9	14	10	–	1	–	1	–	7
37	Framingham	22,935	-	3	–	221	-	53	–	–	–	–	4	14
38	Attleboro	22,510	–	–	–	31	6	37	–	–	1	–	1	15
39	Peabody	22,300	–	1	4	78	12	21	-	–	–	1	1	38
40	Leominster	21,612	–	5	–	36	–	10	–	–	–	2	3	15
41	Methuen	21,365	-	3	–	8	–	10	–	–	-	2	–	11
42	North Adams	20,915	–	–	–	10	3	12	–	–	–	1	–	9
43	Woburn	20,120	–	3	–	34	6	1	–	–	–	–	–	17
44	Westfield	20,054	–	–	–	18	–	14	–	–	1	–	–	16
45	Gardner	19,830	-	1	-	16	1	10	–	–	1	1	1	31
46	Milton	18,750	–	3	–	23	2	14	–	–	–	–	2	10
47	West Springfield	17,560	–	–	–	3	3	–	–	–	–	–	–	13
48	Braintree	17,340	–	6	–	13	1	26	–	–	–	–	–	27
49	Winthrop	17,295	–	2	–	21	4	57	–	–	–	1	5	17
50	Wakefield	16,773	–	2	–	7	5	4	–	–	–	–	-	15
51	Saugus	15,970	–	2	–	21	1	-	–	–	–	–	–	10
52	Dedham	15,924	–	2	–	6	3	8	–	–	–	–	1	10
53	Greenfield	15,660	–	–	–	81	–	3	–	–	–	–	3	21
54	Norwood	15,625	–	2	–	–	-	2	–	–	–	1	–	17
55	Marlboro	15,168	–	1	-	39	1	9	–	–	–	–	1	13
56	Newburyport	14,735	–	-	–	142	1	13	–	–	–	–	–	25
57	Milford	14,718	–	–	–	8	–	16	–	–	–	–	–	10
58	Natick	14,047	–	3	–	120	–	–	–	–	–	–	–	14
59	Danvers	13,705	–	1	–	28	5	15	–	10	–	–	–	6
60	Southbridge	13,471	–	–	–	5	–	3	–	-	–	–	–	13
61	Winchester	13,465	-	2	–	79	-	44	1	–	–	–	2	12
62	Wellesley	12,985	–	2	–	33	2	35	–	-	–	–	2	11
63	Plymouth	12,958	–	–	–	38	2	5	–	–	–	–	1	9
64	Webster	12,735	–	–	–	61	-	–	–	–	–	–	–	7
65	Amesbury	12,330	–	–	-	40	1	15	–	–	–	–	–	16
66	Adams	12,161	-	1	–	5	1	3	-	–	-	1	–	10

Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Smallpox	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
4277	28	15067	5857	1018	10	4	1	12284	206	–	4466	19	32	41	3541	466	917	162	1	11	9834	1
1078	1	5256	1275	541	3	1	–	2435	64	–	1833	2	15	2	992	119	107	12	1	–	2565	2
300	*1*	*2679*	*95*	*81*	–	*2*	–	*887*	*3*	–	*370*	–	*2*	–	*277*	*32*	*22*	*13*	–	–	*1042*	
190	1	2616	46	29	–	2	–	630	1	–	189	–	2	–	189	18	–	9	–	–	519	3
110	–	63	49	52	–	–	–	257	2	–	181	–	–	–	88	14	22	4	–	–	523	4
711	*1*	*819*	*627*	*108*	–	*1*	–	*1635*	*20*	–	*600*	*2*	*5*	*4*	*537*	*69*	*82*	*28*	–	–	*1286*	
196	–	619	259	10	–	1	–	338	11	–	165	–	1	1	124	23	20	5	–	–	437	5
99	–	25	23	57	–	–	–	153	2	–	150	1	1	–	150	20	34	10	–	–	80	6
168	–	99	30	4	–	–	–	266	2	–	93	1	–	2	90	14	6	6	–	–	158	7
124	1	30	28	34	–	–	–	258	2	–	108	–	1	–	92	9	17	5	–	–	309	8
124	–	46	287	3	–	–	–	620	3	–	84	–	2	1	81	3	5	2	–	–	302	9
663	*2*	*1126*	*897*	*189*	*1*	–	–	*2379*	*38*	–	*597*	*5*	*4*	*20*	*529*	*80*	*152*	*25*	–	*2*	*1327*	
75	–	59	9	6	–	–	–	249	16	–	113	1	–	11	86	11	9	6	–	–	29	10
52	–	53	18	2	–	–	–	515	7	–	45	–	–	–	65	19	1	3	–	–	153	11
42	–	161	16	50	–	–	–	77	1	–	90	–	2	–	56	8	4	2	–	–	87	12
64	1	243	172	1	–	–	–	367	3	–	50	1	–	7	40	4	3	1	–	1	290	13
102	–	190	149	8	–	–	–	171	3	–	41	–	–	–	29	3	9	1	–	–	178	14
62	1	13	271	112	1	–	–	377	–	–	67	1	–	–	64	6	9	5	–	1	46	15
68	–	116	20	4	–	–	–	146	3	–	47	1	–	–	57	6	6	1	–	–	153	16
63	–	210	11	–	–	–	–	72	–	–	28	1	–	1	43	2	107	4	–	–	9	17
64	–	14	38	4	–	–	–	209	2	–	50	–	–	–	37	14	4	1	–	–	68	18
28	–	19	–	1	–	–	–	119	3	–	32	–	1	–	14	4	–	–	–	–	7	19
43	–	48	193	1	–	–	–	77	–	–	34	–	1	1	38	3	–	1	–	–	307	20
581	*11*	*1006*	*540*	*48*	*3*	–	–	*1342*	*25*	–	*353*	*3*	*2*	*2*	*364*	*42*	*72*	*22*	–	–	*930*	
92	–	18	6	5	–	–	–	135	2	–	33	–	–	–	32	7	4	4	–	–	131	21
27	–	34	3	1	–	–	–	29	3	–	32	–	–	–	24	5	3	–	–	–	9	22
75	2	11	45	4	–	–	–	148	1	–	55	–	1	–	36	5	2	3	–	–	36	23
62	–	19	13	7	–	–	–	286	3	–	20	–	–	–	25	4	–	–	–	–	13	24
29	–	533	230	2	–	–	–	97	–	–	29	–	–	1	49	3	10	–	–	–	82	25
22	–	235	71	3	–	–	–	102	–	–	31	1	–	–	39	2	–	2	–	–	69	26
52	–	43	11	–	2	–	–	116	–	–	32	–	1	–	26	5	2	1	–	–	121	27
47	1	7	1	6	–	–	–	124	–	–	18	–	–	–	40	–	22	2	–	–	14	28
41	–	9	79	3	–	–	–	42	10	–	50	–	–	–	26	2	4	2	–	–	51	29
9	8	29	34	–	–	–	–	20	1	–	8	2	–	–	22	3	–	4	–	–	24	30
44	–	9	18	1	–	–	–	141	1	–	15	–	–	1	9	2	24	1	–	–	10	31
25	–	42	13	1	–	–	–	44	2	–	12	–	–	–	19	3	1	–	–	–	329	32
56	–	17	16	15	1	–	–	58	2	–	18	–	–	–	17	1	–	3	–	–	41	33
547	*4*	*2818*	*1005*	*28*	*2*	–	–	*1611*	*25*	–	*377*	*4*	*1*	*8*	*413*	*55*	*310*	*16*	–	*3*	*1262*	
8	–	5	1	–	–	–	–	46	–	–	23	–	–	–	21	9	44	1	–	–	–	34
18	1	227	16	2	–	–	–	34	7	–	12	–	–	3	27	1	33	–	–	–	93	35
16	–	3	2	–	–	–	–	185	1	–	20	–	–	–	17	2	–	–	–	–	30	36
18	–	17	28	–	–	–	–	93	–	–	15	–	–	–	10	2	4	3	–	–	120	37
14	1	3	6	1	–	–	–	21	–	–	5	2	–	–	14	1	28	1	–	–	38	38
28	–	4	71	–	–	–	–	69	–	–	21	–	–	–	13	1	2	–	–	1	66	39
48	–	49	1	–	–	–	–	134	–	–	13	–	–	–	20	–	2	1	–	–	4	40
7	1	68	6	–	–	–	–	80	–	–	6	–	–	–	12	1	3	2	–	–	30	41
18	–	6	–	–	–	–	–	12	–	–	14	–	–	–	6	–	–	–	–	–	3	42
7	–	183	5	–	–	–	–	17	–	–	13	–	–	–	4	4	–	–	–	–	18	43
19	–	76	1	1	–	–	–	14	–	–	6	–	–	–	14	–	41	–	–	–	3	44
15	–	4	1	3	–	–	–	55	–	–	13	–	–	2	9	3	8	–	–	–	36	45
12	–	20	17	–	–	–	–	46	–	–	8	–	–	1	8	3	2	–	–	–	85	46
8	–	–	–	–	–	–	–	22	–	–	19	–	–	–	8	–	–	–	–	–	6	47
13	–	9	2	–	–	–	–	44	1	–	8	–	–	–	12	–	–	–	–	1	12	48
10	–	43	30	–	1	–	–	24	1	–	12	–	–	–	7	5	–	1	–	–	161	49
4	–	60	9	–	–	–	–	12	2	–	11	–	1	1	9	1	–	–	–	–	18	50
10	–	5	13	1	–	–	–	46	1	–	6	–	–	–	9	2	26	–	–	–	11	51
4	–	44	20	–	–	–	–	15	–	–	5	–	–	–	3	3	30	–	–	–	–	52
11	–	3	30	–	–	–	–	17	1	–	10	–	–	–	7	–	–	–	–	–	12	53
5	–	–	2	–	–	–	–	68	2	–	13	–	–	–	7	2	4	1	–	–	–	54
8	–	792	–	–	–	–	–	34	–	–	11	–	–	–	2	–	–	–	–	–	7	55
14	–	4	2	1	–	–	–	14	1	–	3	–	–	–	12	–	3	1	–	–	91	56
20	–	4	12	–	–	–	–	18	–	–	5	–	–	–	8	–	9	–	–	–	10	57
14	–	242	23	–	–	–	–	40	–	–	12	–	–	–	12	3	3	–	–	–	69	58
25	–	–	28	–	–	–	–	56	2	–	6	–	–	–	8	1	–	–	–	–	3	59
33	–	14	3	3	–	–	–	53	1	–	8	–	–	–	16	–	5	1	–	–	–	60
12	–	203	136	–	–	–	–	22	1	–	3	–	–	–	4	–	–	1	–	–	58	61
8	–	160	59	1	1	–	–	34	1	–	9	–	–	–	3	–	–	1	–	–	36	62
8	–	5	11	–	–	–	–	14	–	–	8	–	–	–	6	1	2	–	–	–	–	63
8	–	–	89	–	–	–	–	20	–	–	3	–	–	–	5	1	2	1	–	–	1	64
17	–	2	2	1	–	–	–	40	–	–	8	–	–	–	12	3	–	–	–	–	81	65
10	–	–	–	–	–	–	–	14	–	–	7	–	–	–	12	–	–	–	–	1	–	66

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1933	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
67	Needham	12,051	-	1	-	103	3	47	-	-	-	-	11	3
68	Clinton	11,930	-	1	-	-	-	16	-	-	-	-	1	7
69	Athol	11,375	-	-	-	27	5	4	-	-	-	-	-	7
70	Swampscott	11,249	-	-	-	122	1	26	-	-	-	-	1	5
71	Easthampton	11,152	-	-	-	4	-	-	-	-	-	-	-	13
72	Fairhaven	11,029	-	-	-	4	5	15	-	-	-	-	1	7
73	Stoneham	10,690	-	4	-	17	-	29	-	-	1	-	1	9
74	Lexington	10,555	-	4	-	77	1	-	-	-	-	-	3	11
75	Reading	10,463	-	-	-	2	1	1	1	-	-	1	-	14
76	North Attleboro	10,455	-	1	-	1	1	-	-	-	-	-	1	1
	TOWNS OF 5,000–10,000	*345,039*	-	*19*	-	*551*	*49*	*344*	*4*	*1*	*6*	*4*	*36*	*294*
77	Andover	9,764	-	1	-	31	-	7	-	-	1	-	-	16
78	Northbridge	9,495	-	3	-	-	2	-	-	-	-	-	2	4
79	Marblehead	8,950	-	-	-	14	-	44	-	-	-	-	-	11
80	Ludlow	8,921	-	-	-	8	-	1	-	-	-	-	-	6
81	Bridgewater	8,792	-	-	-	13	2	11	-	-	-	-	2	4
82	Hudson	8,685	-	1	-	12	-	3	-	-	-	-	-	7
83	Palmer	8,628	-	1	-	10	-	2	-	-	-	-	-	5
84	Dartmouth	8,619	-	-	-	51	3	29	-	-	1	-	1	6
85	Stoughton	8,425	-	-	-	5	1	6	-	1	-	-	-	9
86	Middleborough	8,268	-	-	-	8	-	1	-	-	-	1	3	7
87	Barnstable	8,238	-	1	-	13	1	31	-	-	-	-	7	23
88	Montague	8,150	-	1	-	5	-	5	-	-	-	-	1	6
89	Walpole	7,767	-	1	-	6	1	4	-	-	-	-	-	7
90	Concord	7,750	-	-	-	2	-	6	-	-	-	-	1	13
91	Agawam	7,616	-	1	-	-	-	-	-	-	2	-	1	6
92	Shrewsbury	7,615	-	-	-	27	1	1	-	-	-	-	-	-
93	Whitman	7,498	-	-	-	5	-	-	-	-	-	-	-	6
94	Chelmsford	7,307	-	-	-	1	1	14	-	-	-	-	-	5
95	Millbury	7,290	-	-	-	50	-	14	-	-	-	-	-	4
96	Dracut	7,243	-	-	-	-	-	-	-	-	-	-	-	3
97	Rockland	7,241	-	1	-	2	-	5	-	-	-	-	-	8
98	Randolph	7,141	-	1	-	6	-	9	-	-	-	-	-	3
99	Grafton	7,065	-	-	-	-	-	-	-	-	1	-	-	2
100	North Andover	7,039	-	-	-	-	-	10	-	-	-	-	6	3
101	Franklin	7,012	-	-	-	14	-	7	-	-	-	-	1	4
102	Hingham	6,977	-	1	-	17	-	7	-	-	-	1	1	6
103	Auburn	6,936	-	1	-	1	1	6	1	-	-	-	-	3
104	South Hadley	6,877	-	-	-	-	1	7	-	-	-	-	-	-
105	Maynard	6,731	-	-	-	3	-	1	-	-	-	-	-	1
106	Ware	6,579	-	-	-	-	-	1	-	-	-	-	-	14
107	Billerica	6,505	-	-	-	-	-	3	-	-	-	-	-	2
108	Westborough	6,448	-	-	-	33	7	10	-	-	-	-	1	6
109	Uxbridge	6,354	-	-	-	8	-	4	-	-	-	-	3	9
110	Mansfield	6,221	-	1	-	18	-	15	-	-	-	-	1	4
111	Winchendon	6,216	-	-	-	8	-	-	-	-	1	-	1	10
112	Spencer	6,113	-	-	-	58	-	12	-	-	-	-	-	3
113	Tewksbury	5,975	-	-	-	7	-	4	-	-	-	1	-	3
114	Abington	5,869	-	-	-	1	6	-	-	-	-	-	-	2
115	Amherst	5,836	-	2	-	5	-	18	-	-	-	-	2	7
116	Somerset	5,771	-	-	-	1	4	2	-	-	-	-	-	1
117	Canton	5,765	-	1	-	17	9	23	3	-	-	-	-	4
118	Wareham	5,744	-	-	-	7	5	3	-	-	-	-	-	23
119	Great Barrington	5,632	-	-	-	24	3	8	-	-	-	-	-	10
120	Foxborough	5,610	-	-	-	19	1	-	-	-	-	-	-	5
121	Orange	5,508	-	-	-	1	-	-	-	-	-	1	1	1
122	Ipswich	5,303	-	-	-	1	-	1	-	-	-	-	-	6
123	Easton	5,279	-	-	-	7	-	1	-	-	-	-	-	4
124	Longmeadow	5,139	-	1	-	32	-	8	-	-	-	-	1	2
125	Seekonk	5,132	-	-	-	-	-	-	-	-	-	-	-	-
	TOWNS OF 2,500–5,000	*194,650*	-	*10*	-	*200*	*40*	*129*	*1*	-	*1*	*3*	*15*	*162*
126	Falmouth	4,902	-	7	-	13	1	16	-	-	-	-	-	6
127	Monson	4,810	-	-	-	-	-	-	-	-	-	-	-	-
128	Leicester	4,658	-	-	-	-	-	-	-	-	-	-	-	2
129	Blackstone	4,593	-	-	-	-	5	-	-	-	-	-	-	1
130	Westport	4,535	-	-	-	12	-	-	-	-	-	-	-	6
131	Swansea	4,389	-	-	-	-	-	-	-	-	-	-	-	2
132	Wilmington	4,335	-	1	-	4	-	8	-	-	-	2	2	10
133	Dalton	4,301	-	-	-	-	-	-	-	-	-	-	-	1
134	Medfield	4,193	-	-	-	4	-	2	-	-	-	-	-	4
135	Holden	4,150	-	-	-	5	-	7	-	-	-	-	2	2
136	Acushnet	4,066	-	-	-	2	18	-	-	-	-	-	-	3
137	Lee	4,061	-	-	-	2	-	5	-	-	-	-	-	7
138	Dudley	4,055	-	1	-	-	-	1	-	-	-	-	-	2
139	Templeton	4,029	-	-	-	-	-	-	-	-	-	1	-	7

Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Smallpox	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
6	-	50	281	1	-	-	-	33	-	-	2	-	-	-	5	2	17	-	-	-	72	67
7	-	73	-	-	-	-	-	26	1	-	1	-	-	-	2	-	-	-	-	-	6	68
2	-	138	-	2	-	-	-	13	-	-	3	-	-	-	7	-	6	-	-	-	12	69
7	1	1	55	8	-	-	-	53	1	-	8	-	-	-	4	-	-	1	-	-	13	70
32	-	184	-	1	-	-	-	17	1	-	4	-	-	-	8	-	33	-	-	-	6	71
7	-	5	4	1	-	-	-	7	-	-	7	-	-	-	8	1	-	-	-	-	24	72
3	-	32	2	1	-	-	-	21	-	-	5	-	-	-	8	1	1	-	-	-	8	73
9	-	77	35	-	-	-	-	20	-	-	5	-	-	1	17	-	-	-	-	-	17	74
4	-	3	2	-	-	-	-	7	-	-	6	-	-	-	11	1	2	-	-	-	2	75
-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	6	1	-	-	-	-	-	76
206	*1*	*512*	*802*	*13*	-	-	-	*910*	*13*	-	*141*	*2*	*2*	*5*	*189*	*33*	*116*	*13*	-	*3*	*647*	
8	-	32	68	-	-	-	-	13	-	-	7	-	-	-	3	1	-	-	-	-	34	77
14	-	24	1	-	-	-	-	8	-	-	3	-	-	-	7	-	-	-	-	1	3	78
2	-	4	128	-	-	-	-	11	-	-	1	1	1	-	8	-	-	-	-	-	50	79
3	-	10	1	-	-	-	-	-	-	-	6	-	-	-	6	1	-	-	-	-	3	80
9	-	2	5	-	-	-	-	27	1	-	2	-	-	-	15	2	-	-	-	-	2	81
2	-	8	7	-	-	-	-	23	-	-	-	-	-	-	5	1	2	1	-	-	15	82
3	-	3	3	-	-	-	-	15	1	-	6	-	-	-	2	1	6	3	-	-	39	83
4	-	1	1	1	-	-	-	15	1	-	-	-	-	-	5	4	-	-	-	-	6	84
5	-	2	1	-	-	-	-	31	-	-	4	-	-	-	7	2	13	-	-	-	-	85
4	-	1	246	-	-	-	-	14	-	-	3	-	-	-	5	1	-	-	-	-	3	86
7	-	1	4	-	-	-	-	57	-	-	7	-	-	-	-	-	-	-	-	-	22	87
4	-	2	5	-	-	-	-	4	-	-	1	-	-	-	3	-	-	-	-	-	-	88
5	-	46	9	-	-	-	-	43	1	-	3	-	-	-	5	-	8	-	-	-	2	89
3	-	22	2	-	-	-	-	18	1	-	-	-	-	-	8	-	-	-	-	-	9	90
1	-	-	-	-	-	-	-	5	-	-	6	-	-	-	3	-	3	-	-	-	-	91
-	-	58	-	-	-	-	-	14	-	-	5	-	-	-	-	-	-	-	-	-	-	92
2	-	1	2	-	-	-	-	6	-	-	1	-	-	-	2	-	-	-	-	-	-	93
5	-	24	-	-	-	-	-	42	-	-	1	-	-	1	2	2	-	-	-	-	6	94
21	-	33	5	-	-	-	-	28	-	-	3	-	-	-	-	-	1	-	-	-	40	95
-	-	2	-	-	-	-	-	1	-	-	3	-	-	-	-	2	-	-	-	-	-	96
3	-	-	10	-	-	-	-	71	-	-	5	-	-	-	5	-	-	1	-	-	3	97
1	-	12	3	-	-	-	-	47	-	-	4	-	-	-	5	2	-	1	-	-	-	98
-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	99
4	-	27	68	-	-	-	-	7	-	-	-	-	-	-	2	-	-	-	-	-	47	100
1	-	-	-	2	-	-	-	23	-	-	1	-	-	-	4	-	12	-	-	-	-	101
3	-	4	1	-	-	-	-	44	2	-	4	-	-	-	2	-	-	1	-	-	46	102
1	-	18	-	-	-	-	-	18	-	-	2	-	-	-	4	1	7	1	-	-	11	103
8	-	10	-	-	-	-	-	7	-	-	1	-	-	-	4	-	7	-	-	-	-	104
1	-	13	-	-	-	-	-	4	-	-	-	1	-	-	2	1	4	-	-	-	1	105
-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	4	-	33	-	-	-	-	106
9	-	35	-	-	-	-	-	24	-	-	5	-	-	-	1	-	-	1	-	-	1	107
5	1	8	10	-	-	-	-	11	1	-	3	-	-	-	9	-	-	-	-	-	64	108
10	-	3	104	-	-	-	-	2	-	-	1	-	-	-	2	2	1	1	-	-	35	109
8	-	6	-	4	-	-	-	5	1	-	7	-	-	-	4	1	8	-	-	-	25	110
1	-	3	-	-	-	-	-	12	-	-	1	-	-	-	2	-	-	-	-	-	64	111
4	-	29	-	-	-	-	-	16	-	-	1	-	-	-	2	-	1	-	-	-	-	112
2	-	1	1	1	-	-	-	27	-	-	6	-	-	4	2	-	-	-	-	-	-	113
2	-	-	-	-	-	-	-	18	-	-	5	-	-	-	5	3	-	-	-	-	-	114
3	-	14	1	-	-	-	-	55	1	-	5	-	-	-	2	1	-	1	-	-	-	115
3	-	-	-	-	-	-	-	-	-	-	2	-	-	-	4	-	-	-	-	-	1	116
2	-	2	23	3	-	-	-	51	-	-	5	-	1	-	6	1	-	1	-	-	23	117
2	-	1	25	1	-	-	-	11	-	-	11	-	-	-	3	3	2	-	-	-	6	118
13	-	36	-	1	-	-	-	10	-	-	-	-	-	-	2	-	-	-	-	-	9	119
14	-	1	3	-	-	-	-	6	-	-	2	-	-	-	11	1	7	-	-	-	8	120
-	-	1	59	-	-	-	-	2	-	-	-	-	-	-	4	-	-	-	-	2	24	121
1	-	2	1	-	-	-	-	32	1	-	4	-	-	-	2	-	-	1	-	-	-	122
1	-	4	5	-	-	-	-	22	1	-	2	-	-	-	5	-	-	-	-	-	5	123
2	-	5	-	-	-	-	-	9	-	-	1	-	-	-	3	-	1	-	-	-	40	124
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	125
99	*5*	*247*	*329*	*2*	*1*	-	*1*	*570*	*4*	-	*94*	*1*	-	-	*99*	*17*	*27*	*13*	-	*3*	*222*	
2	-	6	5	-	-	-	-	20	-	-	10	-	-	-	8	2	-	-	-	-	3	126
-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-	-	-	-	127
2	-	-	-	-	-	-	-	13	-	-	-	-	-	-	1	-	-	-	-	-	-	128
-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	-	-	-	-	129
1	-	-	-	-	-	-	-	-	-	-	7	-	-	-	1	-	-	1	-	-	-	130
-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	1	-	-	-	-	-	131
4	-	7	4	-	-	-	1	10	-	-	6	-	-	-	8	-	-	3	-	-	15	132
2	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	1	-	-	-	-	-	133
1	2	-	5	-	-	-	-	5	-	-	1	-	-	-	11	-	-	-	-	-	4	134
-	-	9	2	-	-	-	-	11	-	-	-	-	-	-	3	1	2	1	-	1	18	135
-	-	-	-	1	-	-	-	1	-	-	1	-	-	-	3	-	-	-	-	-	-	136
1	-	19	1	-	-	-	-	3	-	-	3	-	-	-	1	1	-	1	-	-	1	137
6	-	-	6	-	-	-	-	5	-	-	5	-	-	-	1	-	-	1	-	-	-	138
-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	1	-	-	-	-	-	139

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1933	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
140	Nantucket	4,016	-	1	-	-	-	-	-	-	-	-	-	10
141	Oxford	3,894	-	-	-	14	1	3	-	-	-	-	-	-
142	Williamstown	3,835	-	-	-	-	1	-	-	-	-	-	-	2
143	Wrentham	3,820	-	-	-	20	2	12	-	-	-	-	2	3
144	Provincetown	3,819	-	-	-	5	-	-	-	-	-	-	-	1
145	Warren	3,648	-	-	-	-	-	-	-	-	-	-	-	7
146	Barre	3,627	-	-	-	22	1	1	-	-	-	-	-	1
147	East Bridgewater	3,620	-	-	-	-	-	-	-	-	-	-	-	8
148	Westford	3,614	-	-	-	34	-	6	-	-	-	-	-	1
149	Weston	3,608	-	-	-	1	1	11	-	-	-	-	3	2
150	Sharon	3,498	-	-	-	1	1	5	-	-	-	-	-	5
151	East Longmeadow	3,450	-	-	-	1	-	5	-	-	-	-	-	3
152	Rockport	3,427	-	-	-	-	1	15	-	-	-	-	-	2
153	Holbrook	3,400	-	-	-	3	-	5	-	-	-	-	-	4
154	Bellingham	3,390	-	-	-	-	1	-	-	-	-	-	-	-
155	Wayland	3,376	-	-	-	8	-	2	-	-	-	-	1	4
156	Scituate	3,375	-	-	-	5	-	-	-	-	-	-	1	4
157	Bedford	3,308	-	-	-	7	-	5	-	-	-	-	-	2
158	Belchertown	3,287	-	-	-	-	-	-	1	-	-	-	-	1
159	West Bridgewater	3,260	-	-	-	10	2	-	-	-	-	-	-	2
160	Cohasset	3,189	-	-	-	-	-	1	-	-	-	-	1	5
161	Medway	3,156	-	-	-	-	-	-	-	-	-	-	-	2
162	Dighton	3,108	-	-	-	-	-	1	-	-	-	-	-	2
163	Ayer	3,074	-	-	-	7	-	2	-	-	-	-	1	3
164	Lancaster	3,035	-	-	-	-	-	7	-	-	-	-	1	-
165	Pepperell	3,012	-	-	-	-	-	-	-	-	-	-	-	4
166	North Brookfield	2,994	-	-	-	-	-	-	-	-	-	-	-	1
167	Holliston	2,894	-	-	-	1	-	-	-	-	-	-	-	2
168	Hopedale	2,850	-	-	-	7	1	-	-	-	-	-	-	1
169	Hanover	2,838	-	-	-	5	1	2	-	-	-	-	-	4
170	Deerfield	2,830	-	-	-	-	1	1	-	-	-	-	1	4
171	Bourne	2,817	-	-	-	-	-	-	-	-	-	-	-	1
172	Rehoboth	2,788	-	-	-	-	-	-	-	-	-	-	-	1
173	Kingston	2,764	-	-	-	4	-	2	-	-	-	-	-	-
174	Manchester	2,720	-	-	-	-	-	-	-	-	-	-	-	5
175	Norton	2,718	-	-	-	3	-	2	-	-	-	-	-	4
176	Wilbraham	2,647	-	-	-	-	2	-	-	-	-	-	-	-
177	Lenox	2,645	-	-	-	-	-	2	-	-	-	-	-	2
178	Rutland	2,573	-	-	-	-	-	-	-	-	-	-	-	3
179	Hopkinton	2,557	-	-	-	-	-	-	-	-	-	-	-	1
180	Hadley	2,552	-	-	-	-	-	-	-	-	1	-	-	2
181	Acton	2,540	-	-	-	-	-	-	-	-	-	-	-	-
	TOWNS OF 1,000–2,500	*157,727*	*1*	*9*	-	*492*	*30*	*97*	-	-	*2*	-	*15*	*137*
182	Harwich	2,491	-	-	-	-	8	-	-	-	-	-	-	3
183	Shirley	2,447	-	-	-	16	-	7	-	-	-	-	2	3
184	Avon	2,445	-	-	-	53	-	2	-	-	-	-	-	2
185	Groton	2,437	-	-	-	10	-	-	-	-	-	-	-	2
186	Salisbury	2,435	-	-	-	2	-	-	-	-	-	-	-	2
187	Merrimac	2,418	-	-	-	4	-	7	-	-	-	-	-	3
188	Westwood	2,350	-	-	-	-	-	7	-	-	-	-	-	4
189	Hatfield	2,333	-	-	-	2	-	2	-	-	-	-	-	2
190	Ashland	2,319	-	-	-	-	-	-	-	-	-	-	-	-
191	Groveland	2,245	-	-	-	32	-	-	-	-	-	-	-	-
192	West Boylston	2,241	-	-	-	18	-	4	-	-	-	-	-	-
193	Southborough	2,235	-	-	-	-	-	1	-	-	-	-	-	2
194	Hanson	2,195	-	-	-	7	1	-	-	-	-	-	-	1
195	Raynham	2,139	-	-	-	-	-	-	-	-	-	-	-	-
196	Sutton	2,134	-	-	-	1	-	-	-	-	-	-	1	2
197	North Reading	2,107	1	-	-	2	-	-	-	-	-	-	-	2
198	Douglas	2,086	-	-	-	11	-	-	-	-	-	-	-	6
199	Hardwick	2,083	-	-	-	17	-	-	-	-	-	-	-	3
200	Charlton	2,064	-	-	-	-	-	1	-	-	-	-	-	-
201	Hamilton	2,060	-	-	-	2	-	-	-	-	-	-	-	1
202	Chatham	2,051	-	-	-	-	-	-	-	-	-	-	-	3
203	Upton	2,048	-	-	-	-	8	3	-	-	-	-	-	4
204	Ashburnham	2,030	-	-	-	-	-	-	-	-	-	-	-	-
205	Yarmouth	1,962	-	-	-	19	-	-	-	-	-	-	-	5
206	Lunenburg	1,953	-	-	-	41	1	1	-	-	-	-	-	2
207	Millville	1,949	-	-	-	-	-	-	-	-	-	-	-	1
208	Westminster	1,947	-	-	-	-	-	-	-	-	-	-	-	5
209	Northborough	1,936	-	-	-	-	-	8	-	-	-	-	1	2
210	Northfield	1,930	-	1	-	1	-	1	-	-	-	-	-	1
211	Burlington	1,910	-	-	-	-	1	3	-	-	-	-	-	2
212	Dennis	1,879	-	-	-	-	2	2	-	-	-	-	-	-
213	Marion	1,875	-	-	-	2	1	5	-	-	-	-	-	3
214	Georgetown	1,834	-	1	-	3	1	4	-	-	-	-	-	2

to the Public Health, 1933—Continued

Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Smallpox	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
–	–	–	–	–	–	–	–	1	–	–	3	–	–	–	1	–	–	–	–	–	–	140
1	–	12	–	–	–	–	–	27	–	–	–	–	–	–	3	–	–	–	–	–	–	141
1	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	3	142
36	–	1	–	–	–	–	–	32	–	–	–	–	–	–	16	2	2	–	–	–	18	143
1	–	–	–	–	–	–	–	11	–	–	1	–	–	–	1	–	–	–	–	–	–	144
1	–	3	20	–	–	–	–	5	1	–	–	–	–	–	3	1	1	–	–	–	20	145
–	–	3	1	–	–	–	–	69	3	–	–	–	–	–	5	–	–	–	–	–	3	146
1	–	–	–	–	–	–	–	97	–	–	3	–	–	–	1	1	–	–	–	–	4	147
–	–	18	2	–	–	–	–	24	–	–	–	–	–	–	–	–	–	–	–	–	21	148
6	–	17	4	–	–	–	–	2	–	–	–	–	–	–	1	–	1	–	–	–	31	149
2	–	3	10	–	1	–	–	2	–	–	1	–	–	–	4	–	7	–	–	–	24	150
–	–	1	–	–	–	–	–	4	–	–	4	–	–	–	3	–	–	–	–	–	10	151
–	–	–	–	–	–	–	–	3	–	–	3	–	–	–	3	–	3	2	–	–	4	152
–	–	1	6	–	–	–	–	5	–	–	–	–	–	–	–	1	–	–	–	1	–	153
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	154
1	–	–	–	–	–	–	–	6	–	–	3	–	–	–	–	–	–	–	–	–	–	155
–	1	9	3	–	–	–	–	4	–	–	3	–	–	–	1	–	–	–	–	–	2	156
–	–	16	2	–	–	–	–	6	–	–	2	–	–	–	–	–	–	1	–	–	6	157
1	–	–	–	–	–	–	–	3	–	–	–	–	–	–	1	–	–	1	–	–	–	158
2	–	–	–	–	–	–	–	24	–	–	1	–	–	–	–	–	–	–	–	–	–	159
1	–	2	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	3	160
2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	161
–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	162
2	–	–	11	–	–	–	–	39	–	–	2	–	–	–	1	–	–	–	–	–	–	163
1	–	108	–	–	–	–	–	6	–	–	3	–	–	–	2	1	–	–	–	–	10	164
–	–	–	6	–	–	–	–	7	–	–	4	–	–	–	–	–	3	–	–	–	–	165
2	–	1	–	–	–	–	–	1	–	–	–	–	–	–	2	–	–	–	–	–	–	166
1	–	–	5	–	–	–	–	17	–	–	–	–	–	–	–	1	–	–	–	–	–	167
9	–	–	14	–	–	–	–	6	–	–	1	–	–	–	1	–	–	–	–	–	9	168
4	–	–	219	1	–	–	–	12	–	–	–	–	–	–	4	–	–	–	–	–	–	169
3	–	–	–	–	–	–	–	1	–	–	1	–	–	–	1	–	–	1	–	–	10	170
–	–	–	–	–	–	–	–	1	–	–	3	–	–	–	–	–	–	1	–	–	–	171
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	172
–	–	–	1	–	–	–	–	8	–	–	–	–	–	–	1	–	–	–	–	–	1	173
2	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	174
–	–	–	–	–	–	–	–	11	–	–	1	–	–	–	–	–	6	–	–	1	–	175
–	–	1	–	–	–	–	–	2	–	–	1	1	–	–	3	1	1	–	–	–	–	176
–	–	4	1	–	–	–	–	5	–	–	1	–	–	–	–	–	1	–	–	–	1	177
–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	178
–	–	2	–	–	–	–	–	5	–	–	1	–	–	–	1	–	–	–	–	–	1	179
–	–	–	–	–	–	–	–	30	–	–	–	–	–	–	–	–	–	–	–	–	–	180
–	1	4	–	–	–	–	–	12	–	–	1	–	–	–	1	–	–	–	–	–	–	181
53	*2*	*525*	*243*	*5*	–	–	–	*428*	*11*	–	*88*	–	*1*	–	*67*	*9*	*25*	*15*	–	–	*481*	
–	–	–	–	–	–	–	–	1	–	–	3	–	–	–	1	–	–	–	–	–	–	182
6	–	–	4	–	–	–	–	16	–	–	1	–	–	–	3	–	–	4	–	–	–	183
–	–	4	3	–	–	–	–	25	–	–	1	–	–	–	–	2	–	2	–	–	4	184
–	–	2	1	–	–	–	–	1	–	–	1	–	–	–	–	1	–	–	–	–	–	185
1	–	2	15	–	–	–	–	–	–	–	1	–	–	–	1	–	2	3	–	–	1	186
3	–	–	8	1	–	–	–	1	–	–	1	–	–	–	–	1	1	–	–	–	7	187
–	–	–	–	–	–	–	–	3	–	–	1	–	–	–	–	–	–	–	–	–	–	188
2	–	–	5	–	–	–	–	2	–	–	1	–	–	–	2	–	–	–	–	–	–	189
1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	2	–	–	–	–	–	1	190
2	–	–	3	–	–	–	–	1	–	–	1	–	–	–	1	–	1	–	–	–	17	191
–	–	20	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	14	192
–	–	19	–	–	–	–	–	1	–	–	3	–	–	–	–	–	–	–	–	–	–	193
1	–	1	–	–	–	–	–	12	–	–	1	–	–	–	2	–	–	–	–	–	–	194
–	–	–	–	–	–	–	–	2	–	–	1	–	–	–	–	–	–	–	–	–	–	195
2	–	7	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	196
–	–	–	–	–	–	–	–	1	–	–	3	–	–	–	2	1	–	–	–	–	6	197
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	46	198
–	–	18	–	–	–	–	–	3	–	–	1	–	–	–	3	–	3	–	–	–	–	199
–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	1	1	–	–	–	–	–	200
–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	71	201
–	–	–	–	–	–	–	–	29	1	–	–	–	–	–	1	–	–	–	–	–	–	202
2	–	–	3	–	–	–	–	27	–	–	1	–	–	–	3	–	1	–	–	–	17	203
–	–	–	–	–	–	–	–	53	–	–	–	–	–	–	2	–	–	–	–	–	–	204
–	–	–	–	–	–	–	–	4	–	–	3	–	–	–	1	–	–	–	–	–	16	205
–	–	3	12	–	–	–	–	3	1	–	1	–	–	–	1	–	–	–	–	–	6	206
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	207
–	–	–	–	–	–	–	–	2	–	–	2	–	–	–	–	–	–	–	–	–	–	208
1	–	20	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	3	–	–	6	209
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	3	210
2	–	15	–	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	3	211
–	–	1	–	–	–	–	–	2	–	–	1	–	–	–	2	–	–	–	–	–	2	212
1	–	–	4	–	–	–	–	1	–	–	1	–	–	–	1	–	–	–	–	–	4	213
2	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	214

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1933	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
215	Williamsburg	1,826	–	–	–	1	–	–	–	–	–	–	–	–
216	Lynnfield	1,760	–	–	–	–	–	–	–	–	–	–	–	1
217	Middleton	1,738	–	–	–	–	–	2	–	–	–	–	–	1
218	Sturbridge	1,727	–	–	–	–	–	–	–	–	–	–	–	–
219	Stockbridge	1,720	–	1	–	2	–	2	–	–	–	–	–	3
220	Millis	1,708	–	–	–	–	–	2	–	–	–	–	–	–
221	Duxbury	1,699	–	–	–	86	–	–	–	–	–	–	1	1
222	West Newbury	1,685	–	–	–	–	–	–	–	–	–	–	–	4
223	Sheffield	1,672	–	1	–	29	–	3	–	–	–	–	–	6
224	Nahant	1,668	–	–	–	–	–	–	–	–	–	–	–	–
225	Townsend	1,664	–	–	–	–	–	1	–	–	–	–	–	–
226	Hull	1,657	–	3	–	–	–	–	–	–	–	–	–	2
227	Freetown	1,653	–	–	–	–	–	–	–	–	–	–	–	3
228	Lakeville	1,652	–	–	–	6	2	–	–	–	–	–	–	–
229	Plainville	1,625	–	–	–	–	–	–	–	–	–	–	–	–
230	Tisbury	1,612	–	–	–	–	–	–	–	–	–	–	–	–
231	Lincoln	1,612	–	–	–	40	–	–	–	–	–	–	–	–
232	Cheshire	1,604	–	–	–	–	1	–	–	–	–	–	–	1
233	Newbury	1,591	–	–	–	–	–	–	–	–	–	–	–	4
234	Southwick	1,584	–	–	–	1	–	2	–	–	–	–	–	6
235	Norfolk	1,568	–	–	–	–	–	–	–	–	–	–	–	–
236	Norwell	1,551	–	–	–	–	–	–	–	–	–	–	–	1
237	Shelburne	1,547	–	–	–	–	–	–	–	–	–	–	–	1
238	Marshfield	1,528	–	–	–	5	–	–	–	–	–	–	2	2
239	Tyngsborough	1,517	–	–	–	1	–	1	–	–	–	–	2	5
240	Essex	1,504	–	–	–	–	–	–	–	–	–	–	–	–
241	Pembroke	1,498	–	–	–	–	–	–	–	–	–	–	–	–
242	Sterling	1,496	–	1	–	–	–	–	–	–	–	–	–	–
243	Littleton	1,469	–	–	–	–	2	1	–	–	–	–	–	–
244	Mattapoisett	1,466	–	–	–	1	–	6	–	–	–	–	1	1
245	Buckland	1,463	–	–	–	–	1	–	–	–	–	–	–	1
246	Chester	1,433	–	–	–	–	–	–	–	–	–	–	–	–
247	Carver	1,426	–	–	–	–	–	–	–	–	–	–	–	1
248	Sandwich	1,411	–	–	–	12	–	1	–	–	–	–	–	–
249	Oak Bluffs	1,346	–	–	–	–	–	–	–	–	–	–	–	1
250	Clarksburg	1,341	–	–	–	–	–	1	–	–	–	–	–	1
251	Rowley	1,327	–	–	–	–	–	1	–	–	–	–	–	1
252	Brookfield	1,321	–	–	–	1	–	4	–	–	–	–	1	–
253	Edgartown	1,298	–	–	–	–	–	–	–	–	–	–	–	1
254	Dover	1,292	–	–	–	6	–	–	–	–	–	–	–	–
255	Colrain	1,284	–	–	–	1	–	1	–	–	1	–	–	–
256	Orleans	1,246	–	–	–	12	–	3	–	–	–	–	3	3
257	West Brookfield	1,222	–	–	–	9	–	5	–	–	–	–	–	1
258	Erving	1,221	–	–	–	–	–	–	–	–	–	–	–	–
259	Wenham	1,216	–	–	–	1	–	–	–	–	–	–	–	3
260	Hinsdale	1,206	–	–	–	–	–	1	–	–	–	–	–	–
261	Boylston	1,178	–	–	–	–	–	1	–	–	–	–	–	2
262	Lanesborough	1,167	–	–	–	–	–	–	–	–	1	–	–	–
263	Rochester	1,163	–	–	–	–	–	–	–	–	–	–	–	1
264	Mendon	1,152	–	–	–	1	–	–	–	–	–	–	–	–
265	Russell	1,136	–	–	–	–	–	–	–	–	–	–	–	2
266	Berkley	1,120	–	–	–	–	1	–	–	–	–	–	–	–
267	Stow	1,116	–	–	–	24	–	–	–	–	–	–	–	1
268	Sunderland	1,078	–	–	–	1	–	–	–	–	–	–	–	–
269	Whately	1,078	–	–	–	–	–	–	–	–	–	–	–	–
270	Berlin	1,075	–	–	–	–	–	–	–	–	–	–	–	4
271	West Stockbridge	1,072	–	–	–	–	–	1	–	–	–	–	1	–
272	Huntington	1,047	–	–	–	–	–	–	–	–	–	–	–	–
273	Sudbury	1,046	–	1	–	–	–	–	–	–	–	–	–	–
274	Topsfield	1,028	–	–	–	8	–	–	–	–	–	–	–	2
275	Ashby	1,027	–	–	–	1	–	–	–	–	–	–	–	1
276	Gill	1,022	–	–	–	–	–	–	–	–	–	–	–	1
	TOWNS UNDER 1,000	*37,640*	–	*3*	–	*94*	*3*	*20*	–	–	–	–	*2*	*16*
277	Harvard	984	–	–	–	–	–	3	–	–	–	–	–	–
278	Hubbardston	977	–	–	–	–	–	–	–	–	–	–	–	1
279	Sherborn	949	–	–	–	2	–	–	–	–	–	–	–	1
280	Granby	940	–	–	–	–	–	–	–	–	–	–	–	–
281	Southampton	937	–	–	–	–	–	–	–	–	–	–	–	1
282	East Brookfield	926	–	–	–	–	–	–	–	–	–	–	–	–
283	Bernardston	923	–	–	–	–	–	–	–	–	–	–	–	1
284	Brimfield	910	–	–	–	–	–	–	–	–	–	–	–	–
285	Conway	881	–	–	–	–	–	–	–	–	–	–	–	–
286	Wellfleet	845	–	–	–	–	–	–	–	–	–	–	–	–
287	Ashfield	826	–	–	–	–	–	–	–	–	–	–	–	–
288	Charlemont	816	–	–	–	–	–	–	–	–	–	–	–	–
289	Halifax	800	–	–	–	–	–	–	–	–	–	–	1	–

Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Smallpox	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	14	215
1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	216
-	-	-	-	-	-	-	-	22	-	-	1	-	-	-	1	-	-	-	-	-	-	217
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	218
-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	1	-	-	-	-	-	37	219
1	-	-	-	-	-	-	-	9	-	-	2	-	-	-	4	-	-	-	-	-	41	220
1	1	1	20	-	-	-	-	4	1	-	1	-	-	-	2	-	-	-	-	-	-	221
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	222
-	-	29	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	3	223
-	-	1	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-	-	-	2	224
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	11	225
-	-	-	2	-	-	-	-	-	-	-	3	-	-	-	2	-	-	-	-	-	-	226
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	227
-	1	1	3	-	-	-	-	4	-	-	1	-	-	-	1	-	-	-	-	-	-	228
-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	229
-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	230
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	231
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	232
1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	233
1	-	30	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	6	234
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	235
-	-	-	-	-	-	-	-	16	-	-	1	-	-	-	-	-	-	-	-	-	-	236
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	3	237
-	-	4	1	-	-	-	-	6	-	-	3	-	-	-	-	-	-	-	-	-	-	238
-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	1	-	-	-	-	-	2	239
-	-	1	-	-	-	-	-	3	-	-	6	-	-	-	1	-	1	-	-	-	-	240
-	-	-	-	-	-	-	-	2	-	-	3	-	-	-	-	1	-	-	-	-	-	241
1	-	46	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	242
1	-	-	-	-	-	-	-	11	-	-	5	-	-	-	-	-	-	-	-	-	60	243
-	-	-	125	-	-	-	-	1	-	-	2	-	-	-	1	-	-	-	-	-	42	244
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	245
2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	246
-	-	-	1	-	-	-	-	2	-	-	4	-	-	-	2	-	-	-	-	-	-	247
3	-	-	-	-	-	-	-	9	-	-	-	-	-	-	1	-	-	-	-	-	-	248
1	-	2	-	-	-	-	-	13	-	-	2	-	-	-	3	-	-	-	-	-	2	249
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	251
1	-	157	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	252
-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	2	-	-	-	253
1	-	2	5	-	-	-	-	1	1	-	1	-	-	-	1	-	-	-	-	-	5	254
-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	255
2	-	1	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	2	256
-	-	122	-	-	-	-	-	4	-	-	-	-	-	-	-	-	2	-	-	-	-	257
-	-	-	22	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	6	258
-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	1	-	-	-	-	-	5	259
-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	1	-	-	-	-	-	-	260
-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	261
-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	-	-	-	-	262
1	-	1	-	-	-	-	-	14	-	-	2	-	-	-	-	-	-	-	-	-	4	263
-	-	2	-	-	-	-	-	12	-	-	1	-	-	-	1	-	-	-	-	-	1	264
-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	265
-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	266
2	-	1	-	-	-	-	-	3	-	-	-	-	1	-	-	-	-	-	-	-	4	267
-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	268
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	269
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	270
1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	271
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	5	-	-	-	-	272
-	-	7	-	-	-	-	-	3	-	-	2	-	-	-	-	-	-	-	-	-	-	273
-	-	-	-	-	-	-	-	1	6	-	1	-	-	-	-	-	2	-	-	-	-	274
-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	-	-	1	275
3	-	1	-	4	-	-	-	3	-	-	-	-	-	-	1	-	-	-	-	-	-	276
15	-	*78*	*43*	*1*	-	-	-	*85*	*3*	-	*13*	-	-	-	*12*	*4*	*4*	-	-	-	*63*	
-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	1	-	-	-	-	2	277
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	—	278
1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	279
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	280
-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	1	-	-	-	1	281
-	-	-	-	-	-	-	-	5	-	-	1	-	-	-	-	-	-	-	-	-	-	282
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	283
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	284
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	285
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	286
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	287
1	-	-	-	-	-	-	-	2	-	-	1	-	-	-	1	-	-	-	-	-	-	288
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	289

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1933	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
290	New Marlborough	783	-	-	-	28	-	2	-	-	-	-	-	-
291	Brewster	769	-	-	-	-	-	3	-	-	-	-	-	1
292	Bolton	742	-	-	-	2	-	-	-	-	-	-	-	-
293	Hampden	715	-	-	-	-	-	-	-	-	-	-	-	-
294	Granville	713	-	-	-	2	-	2	-	-	-	-	-	-
295	Paxton	705	-	-	-	-	-	1	-	-	-	-	-	1
296	Princeton	702	-	-	-	-	-	-	-	-	-	-	-	-
297	Royalston	698	-	-	-	-	-	-	-	-	-	-	-	-
298	Boxford	694	-	1	-	-	-	-	-	-	-	-	-	-
299	Leverett	683	-	-	-	-	-	-	-	-	-	-	-	1
300	Petersham	660	-	-	-	2	-	1	-	-	-	-	-	-
301	Blandford	612	-	-	-	-	-	-	-	-	-	-	-	-
302	Becket	607	-	-	-	-	-	1	-	-	-	-	-	1
303	Carlisle	602	-	-	-	-	-	-	-	-	-	-	-	-
304	Eastham	572	-	-	-	-	-	-	-	-	-	-	-	-
305	Richmond	560	-	-	-	-	-	1	-	-	-	-	-	-
306	Cummington	543	-	-	-	3	-	-	-	-	-	-	-	-
307	Egremont	535	-	-	-	-	-	1	-	-	-	-	-	-
308	Worthington	518	-	-	-	-	-	-	-	-	-	-	-	-
309	Truro	516	-	-	-	1	-	-	-	-	-	-	-	-
310	Plympton	511	-	-	-	-	-	-	-	-	-	-	-	2
311	Oakham	492	-	-	-	-	-	-	-	-	-	-	-	-
312	Pelham	416	-	-	-	-	-	1	-	-	-	-	-	-
313	Dunstable	410	-	-	-	51	-	-	-	-	-	-	-	-
314	Dana	408	-	-	-	-	-	-	-	-	-	-	-	-
315	Chesterfield	407	-	-	-	-	-	1	-	-	-	-	-	1
316	New Braintree	401	-	-	-	-	-	-	-	-	-	-	-	-
317	Mashpee	400	-	1	-	-	-	-	-	-	-	-	-	-
318	Westhampton	396	-	-	-	-	-	-	-	-	-	-	-	-
319	Windsor	387	-	-	-	-	-	-	-	-	-	-	-	-
320	New Salem	379	-	-	-	-	-	-	-	-	-	-	-	-
321	Sandisfield	379	-	-	-	3	-	-	-	-	-	-	-	1
322	Warwick	370	-	-	-	-	-	-	-	-	-	-	-	2
323	Otis	354	-	-	-	-	-	-	-	-	-	-	-	-
324	Heath	350	-	-	-	-	-	-	-	-	-	-	-	-
325	Phillipston	341	-	-	-	-	-	1	-	-	-	-	-	-
326	Enfield	335	-	-	-	-	-	-	-	-	-	-	-	1
327	Wendell	327	-	-	-	-	3	-	-	-	-	-	-	-
328	Plainfield	322	-	-	-	-	-	-	-	-	-	-	-	-
329	Wales	314	-	-	-	-	-	-	-	-	-	-	-	-
330	Monterey	308	-	-	-	-	-	-	-	-	-	-	-	-
331	Boxborough	301	-	-	-	-	-	1	-	-	-	-	1	-
332	Rowe	301	-	-	-	-	-	-	-	-	-	-	-	-
333	Hawley	290	-	-	-	-	-	-	-	-	-	-	-	-
334	Florida	273	-	-	-	-	-	-	-	-	-	-	-	-
335	Hancock	268	-	-	-	-	-	-	-	-	-	-	-	-
336	Monroe	263	-	-	-	-	-	-	-	-	-	-	-	-
337	Leyden	260	-	1	-	-	-	-	-	-	-	-	-	-
338	Chilmark	258	-	-	-	-	-	-	-	-	-	-	-	-
339	Savoy	258	-	-	-	-	-	-	-	-	-	-	-	-
340	Goshen	248	-	-	-	-	-	-	-	-	-	-	-	-
341	West Tisbury	231	-	-	-	-	-	-	-	-	-	-	-	-
342	Shutesbury	228	-	-	-	-	-	-	-	-	-	-	-	-
343	Tyringham	227	-	-	-	-	-	-	-	-	-	-	-	-
344	Washington	219	-	-	-	-	-	-	-	-	-	-	-	-
345	Alford	191	-	-	-	-	-	1	-	-	-	-	-	-
346	Middlefield	184	-	-	-	-	-	-	-	-	-	-	-	-
347	Gay Head	158	-	-	-	-	-	-	-	-	-	-	-	-
348	Holland	137	-	-	-	-	-	-	-	-	-	-	-	-
349	Tolland	128	-	-	-	-	-	-	-	-	-	-	-	-
350	Montgomery	112	-	-	-	-	-	-	-	-	-	-	-	-
351	Gosnold	110	-	-	-	-	-	-	-	-	-	-	-	-
352	Peru	108	-	-	-	-	-	-	-	-	-	-	-	-
353	Greenwich	102	-	-	-	-	-	-	-	-	-	-	-	1
354	New Ashford	75	-	-	-	-	-	-	-	-	-	-	-	-
355	Mount Washington	60	-	-	-	-	-	-	-	-	-	-	-	-
356	Tewksbury State Infirmary	-	-	-	-	-	-	-	-	-	-	-	-	-
357	Out of State	-	-	1	-	1	2	-	-	-	1	-	-	-

Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Smallpox	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
1	-	2	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	10	290
-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	291
-	-	-	-	-	-	-	-	34	-	-	-	-	-	-	-	-	-	-	-	-	19	292
1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	1	-	-	-	-	293
1	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	294
-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	295
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	296
-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	297
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	298
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	299
1	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	301
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1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	307
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	308
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-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	311
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-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	313
-	-	25	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	314
-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	315
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-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	320
-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	321
-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	322
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	323
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	324
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3	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	20	330
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1	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	345
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20	-	1	-	2	-	-	-	1	-	-	-	-	-	-	53	1	-	1	-	-	9	356
4	-	-	1	-	-	-	-	1	-	-	-	-	-	-	9	5	-	4	-	-	-	357

REPORT OF DIVISION OF FOOD AND DRUGS

Hermann C. Lythgoe, *Director*

The Food and Drug Division during the year 1933 has been engaged in the usual activities relative to the enforcement of the laws pertaining to the sale of milk, foods and drugs; the slaughtering laws; the cold storage laws; the bakery law; the mattress law; the pasteurization establishment law; as well as in the examination of liquor and chemicals submitted by police departments.

In connection with this work it was necessary to make 379 prosecutions, which is somewhat in excess of those of previous years. This increase in prosecutions has been due to an increase in the sale of decomposed foods. During the year 1933, there were 109 prosecutions for this cause, and during the five years from 1928 to 1932 inclusive there were only 56 such prosecutions. There were 101 prosecutions for violation of the laws relating to milk and milk products. The low standard milk cases were mostly brought against restaurant keepers who served partially skimmed milk to their customers. The cases relating to cream removed were against restaurant keepers and producers. The watered milk cases were brought against producers, and, in a few instances, against dealers.

There were quite a number of cases brought against persons for selling incompletely pasteurized milk as pasteurized. This violation is probably more extensive than our inspectors ascertain, due to the difficulty in getting the evidence of such violation. In most of the cases prosecuted the inspectors arrived at the plant while pasteurization was going on and were therefore able to get the necessary evidence to show either that the temperature of the milk was below that specified in the law or else the milk had not been held at the pasteurizing temperature for the statutory time.

There were 35 cases brought against licensees of pasteurization establishments for violation of the regulations. Unsanitary conditions were responsible for most of these cases.

There were 6 cases for violation of the Grade A Regulations, such as selling Grade A milk with a fat content less than the 4 per cent specified by the regulations; and in one instance we were able to get the evidence to show that the milk was dated as being pasteurized on, say, a Wednesday, whereas in fact it was pasteurized on a Tuesday. In this case the inspector obtained a sample dated as being pasteurized on Wednesday prior to the time when the Grade A milk was pasteurized on that day, and, subsequently, within a few weeks, two inspectors were in the plant and saw a workman remove the outside caps from returned Grade A milk and replace them with caps dated subsequent to the time of pasteurization.

One case involved the misbranding of milk. This milk was labeled as being produced by Guernsey cows, and the analysis and other evidence gathered showed that it was produced by Holstein cows.

There were 7 prosecutions for the sale of adulterated vanilla extract—one case against a manufacturer, and 6 cases against druggists.

There were 39 cases for the sale of adulterated Hamburg steak, of which 11 represented Hamburg steak containing from 5 per cent to 7 per cent of added water; and 28 represented Hamburg steak containing sodium sulphite, either not labeled as required by regulation or statute, or containing quantities of sodium sulphite in excess of that specified by statute.

There were 28 prosecutions relating to sausages. Seven of the samples contained excessive quantities of starch; 10 contained sodium sulphite and the packages were not so labeled; and 11 were artificially colored.

There were 6 cases relative to the sale of low standard vinegar. Several adulterated samples were traced to one manufacturer in Western Massachusetts and the balance were brought into Massachusetts by Rhode Island persons. We were able in each of these cases to prosecute the person morally responsible for the conditions existing.

Of the decomposed food samples, the largest number related to Hamburg steak, there being 70 such cases. There were 13 cases relating to decomposed sausages; 11 cases relating to decomposed liver; 10 cases relating to decomposed eggs; 2 cases relating to decomposed pigs' kidneys; and one each relating to decomposed pork chops, beef flanks, and butter.

It will be noted in the summary that one case relating to low standard butter was dismissed for want of prosecution. This was the same sample upon which a prosecution was based and upon which a conviction was obtained for selling decomposed butter.

The penalties for the sale of decomposed food have been apparently in many instances inadequate. In some instances the cases were placed on file, and in others the maximum fine was imposed. It has been found difficult in appealed cases to maintain the penalties imposed in the lower courts. The District Attorney of Middlesex County stated repeatedly that he did not propose to make criminals of people and would impose penalties in the superior court only if the defendant had a prior record. Subsequently, this attitude was changed after a case went to trial, at which trial both the chemist and bacteriologist testified as to the character of the material in question. Some cases disposed of in the Suffolk Superior Court, where the maximum fine had been imposed in the lower court, resulted in the imposition of the same fine upon the request of the department.

There were 5 cases relative to unsanitary conditions: 1 brought under the general sanitary food law; 3 under the bakery law; and in 1 case the proprietor of a soft drink factory, operating under unsanitary conditions, was prosecuted for operating such factory without a license.

There were 22 cases pertaining to the false advertising of food, of which 21 related to eggs. These eggs were advertised as "Fresh" or as "Fresh Western" and did not correspond in composition to such description.

There were only 27 cases relating to violation of the cold storage laws, all of which pertained to the sale of cold storage eggs without labeling the package as required by law. It is indeed surprising how many persons engaged in the sale of eggs state that they are not aware that cold storage eggs must be so labeled when sold. It is also surprising that the general public, not in the business of selling eggs, is fully aware of the existence of this law.

There were 2 cases brought for the sale of adulterated drugs. These were against the same person who sold linseed oil to a man who used it for rubbing upon the skin of a baby under the impression that the material was cottonseed oil. An inspector of the department obtained a purchase of the same material under the name of "cottonseed oil." Cases were brought both on the sale to the citizen who complained and on the sale to the inspector, resulting in conviction and appeal. Between the hearing in the lower court and the hearing in the superior court, the complainant had started civil procedure against the defendant, and when this was ascertained during the trial at the superior court, the Judge placed the case on file.

There were only 3 prosecutions for violations of the slaughtering laws; and there were 6 prosecutions for violations of the mattress law.

The total number of cases was 379, of which 340 resulted in convictions; 31 were found not guilty; 5 were dismissed for want of prosecution or were nol prossed in the superior court; 2 were placed on file without finding; and in one instance the court continued the case for a year without finding.

The following table gives a summary of the prosecutions:

Summary of Prosecutions

Character of Sample or Nature of Violation	Conviction	Not Guilty	Nol Prossed or Dismissed for Want of Prosecution	On File Without Finding	Continued for One Year Without Finding	Total
Low standard milk	19	–	–	–	–	19
Removal of cream	7	1	1	–	–	9
Watered milk	8	1	–	–	–	9
Improperly pasteurized milk	16	2	–	–	–	18
Violation of pasteurization regulations	29	4	–	2	–	35
Violation of Grade A regulations	6	–	–	–	–	6
Misbranding of milk	1	–	–	–	–	1
Low standard butter	3	–	1	–	–	4
Sewage polluted clams	13	3	1	–	–	17
Vanilla extract	7	–	–	–	–	7
Hamburg steak:						
Containing added water	8	3	–	–	–	11
Containing sodium sulphite in violation of regulations	19	1	–	–	–	20
Containing sodium sulphite in violation of law	8	–	–	–	–	8
Maple syrup	3	–	–	–	–	3
Marshmallow whip	1	–	–	–	–	1
Olive oil	1	1	–	–	–	2
Sausages:						
Excess starch	6	1	–	–	–	7
Containing sodium sulphite and not so labeled	10	–	–	–	–	10
Containing color	11	–	–	–	–	11
Smoked shoulder infested with maggots	–	–	–	–	1	1
Low standard vinegar	6	–	–	–	–	6
Decomposed food:						
Butter	1	–	–	–	–	1
Eggs	9	1	–	–	–	10
Beef flank	–	1	–	–	–	1
Hamburg steak	62	6	2	–	–	70
Liver	11	–	–	–	–	11
Pig kidneys	2	–	–	–	–	2
Pork chops	1	–	–	–	–	1
Sausages	12	1	–	–	–	13
False advertising of foods:						
Eggs	18	3	–	–	–	21
Maple syrup	1	–	–	–	–	1
Relating to unsanitary conditions:						
Violation of sanitary food law	1	–	–	–	–	1
Unsanitary bakery	3	–	–	–	–	3
Unsanitary soft drink factory, not licensed	1	–	–	–	–	1
Cold storage eggs	25	2	–	–	–	27
Adulterated drugs	2	–	–	–	–	2
Violation of slaughtering laws	3	–	–	–	–	3
Violation of bedding laws	6	–	–	–	–	6
Totals	340	31	5	2	1	379

Details of prosecutions will be found in Table I.

During the year, there were examined 14,912 samples, which is nearly 300 less than were examined in 1932. There was a decrease in the number of liquor samples submitted; a decrease in the number of milk samples submitted, both for chemical and bacteriological purposes; and an increase in the number of food samples examined. This change in the character of the samples collected was due to the unprecedented quantity of decomposed food sold in the meat markets, and the inspectors were removed to some extent from milk work and put upon meat work, which requires more time both to collect and to examine the samples. The decrease in bacteriological samples was due to collecting more samples of milk as sold to the public and fewer samples of milk intended to be pasteurized being taken at the pasteurization plants. One inspector can readily bring in 40 samples from one pasteurization plant, but the same inspector can collect hardly more than 20 samples from the different milk wagons if limited to one sample of each grade of milk sold by each dealer.

The quality of the milk on the market was far better than at any time in the history of the department. Prior to 1931, about 2 per cent or 3 per cent of the milk samples collected by the inspectors contained added water. It should be understood that this does not represent the average market supply because fully 25 per cent of the samples collected are obtained from sources under suspicion. In 1931, the number of watered samples was slightly under 1 per cent of the total samples collected; in 1932, 0.82 per cent of the total samples; and in 1933, only 20 samples, representing 0.39 per cent were watered. The average composition of the milk collected was exceptionally high. The total samples, including skimmed and watered samples, had an average composition of 12.62 per cent total solids and 3.90 per cent fat. Excluding the skimmed and watered samples, the average was 12.71 per cent total solids and 3.95 per cent fat. This means that nearly half the milk sold in this State was Grade A quality, as far as the chemical constituents are concerned.

There were 11 samples of skimmed milk sold as such, and there were 64 samples of milk sold as pure milk, from which milk a portion of the fat had been removed. Some of this milk came from producers; some came from milk dealers; but most of these samples came from restaurants. It is practically impossible for a restaurant keeper to store milk in a tank with a stopcock at the bottom, and draw off for his customers milk which contains all the fat which was in the milk at the time it was delivered to the restaurant. Many of the proprietors of these restaurants discover with considerable surprise that cream has the faculty of rising. If the proprietor of a restaurant will furnish his customers milk in half pint bottles as put up by the milk dealer, he is then very liable to furnish his customers with standard milk. Under these conditions he usually charges a little more for the milk, and the result is an increased profit to the proprietor of the restaurant and the sale of a superior article to the customers.

A summary of the milk statistics will be found in Table 2 and Table 3.

There were 3,930 samples of milk examined bacteriologically. Included in these was 1 sample of cream; 121 samples of incompletely pasteurized milk obtained during efficiency tests upon pasteurization plants; and 121 samples of milk obtained from dairy herds by the veterinary inspectors and examined for hemolytic bacteria in connection with investigations of infectious diseases suspected to have occurred in connection with the milk from which the samples were obtained. The balance of 3,682 samples represents raw milk prior to pasteurization and milk sold to the public. Of these samples, all but 492 complied with the requirements.

There were 81 samples of certified and pasteurized milk. Of these, 76 samples had counts below 500; the geometric average was 36. There were 97 samples of certified milk, only 4 of which were above the 10,000 count prescribed for this type of milk; the highest count was 580,000; the geometric average was 2,096.

There were 222 samples of Grade A milk examined, only 28 of which were in excess of the 25,000 limit prescribed by the regulations. The subsequent samples obtained from vendors of this milk under conditions provided for in the regulations were in all instances below 25,000. The geometric average of all Grade A milk was 4,372.

There were obtained 907 samples of pasteurized milk, of which 166 showed a count above 50,000. Whenever high counts were found in pasteurized milk, inspectors were sent to the plant where the milk was pasteurized for the purpose of ascertaining what was wrong at the plant, and, as a rule, discovered reasons for the high counts. The average of this milk, however, was 12,034, which is lower than the requirement for Grade A milk.

There were only 17 samples of Grade A Massachusetts milk collected, of which 16 were below the 100,000 limit prescribed by statute; the highest count was 240,000; the geometric average was 14,655.

There were 337 samples of raw milk sold as such. Of these, 231 had counts below 50,000; 320 had counts below 300,000; and only 17 had counts above this figure; the highest count was 1,500,000; the geometric mean was 23,625.

There were 190 samples of raw milk intended to be pasteurized as Grade A. Of these, 144 had counts below 100,000; and only 21 had counts above the 250,000 set by regulation; the highest count was 2,600,000; the geometric average was 28,234.

The largest number of samples—1,831, represented raw milk to be pasteurized for ordinary market pasteurized milk. The general trend of the bacterial counts of this milk was low. Of this milk, 67 per cent corresponded to Grade A milk; the geometric average of all the figures was 64,334.

The results of this year's work bears out the conclusion that nearly one third of the milk sold at retail to the householder is of Grade A quality, both as to the chemical and bacteriological requirements.

The geometric mean of the bacteria counts of the various grades of milk was very similar to that reported last year and was approximately as follows:—

Certified and pasteurized	40
Certified	2,000
Grade A	4,000
Pasteurized	12,000
Grade A Massachusetts	15,000
Raw milk sold as such	24,000
Raw milk for Grade A purposes	28,000
Raw milk to be pasteurized	64,000

A summary of the bacteriological examinations of milk will be found in Table 4.

There were 2,677 samples of food examined, which is 554 samples more than were examined in 1932. A summary of these analyses will be found in Table 5.

This increase in samples was due to the discovery that the sale of decomposed meat was on the increase, and apparently was a repetition of the conditions which existed during the war, when the price of meat was rising and dealers held the material for too long a period desiring to make a larger profit due to the expected increase in price. Of the 2,677 samples of food collected and examined, 1,800 were meat samples, and because of the increased laboratory work, as well as the increase in time necessary to collect these samples, there was naturally a curtailment in the number of milk samples, and, furthermore, because of this increase in the sale of decomposed meat there was an increase in the number of prosecutions, which of course cut down the amount of time that the chemists could spend in the laboratory.

There were 498 adulterated samples of food. The single adulterated sample of alimentary paste was egg noodles below the standard in egg content. The two adulterated samples of bakery products consisted of a moldy blueberry pie and a piece of bread containing a portion of a cigarette. The result of the moldy pie sample was an examination of the bakery, where unsanitary conditions were found. A hearing was given to the proprietor and he agreed to make such corrections as in our opinion would prevent further contamination of his products with mold. A subsequent inspection by an inspector showed that these corrections were made and there were no further complaints as to the character of the products which were sold by this baker.

The other sample, containing a cigarette, was submitted to the department as representing a sample purchased. An inspector was sent to visit the factory and he found employees working in the mixing room, smoking cigarettes. He also found cigarette butts around the place. It was evident from the conversation with the proprietor that he was unable to stop the practice of smoking in the bakery.

The inspector asked for a complaint against the proprietor of the bakery, first, for violating the food and drug laws by selling bread containing a cigarette; and second, for violating the regulations of the department relating to the operation of a bakery. The court refused to grant either complaint.

There were 7 samples of butter below the legal standard in fat. These samples varied in fat from 77.5 per cent to 79.8 per cent, the average fat being 78.99 per cent, which is not very much below the standard of 80 per cent. Fifty-three samples complied with the law, the fat varying from 80 per cent to 85.7 per cent, with 1 sample as high as 89.6 percent. The average was 82.12 per cent, which is a fairly high average as compared with the standard of 80 per cent. Fifty per cent of the samples had a fat content between 80.5 per cent and 82.8 per cent.

The single sample of chocolate milk reported adulterated resulted in a warning being sent to the manufacturer. This was made with skimmed milk and chocolate syrup. The manufacturer was informed that if subsequent material of that composition were sold under the name of "Chocolate Milk", a prosecution would result.

There were 4 samples of dried fruits which contained sulphur dioxide, and the packages containing these were not labeled as prescribed by the regulations.

There were 417 samples of eggs collected, of which 99 were reported as adulterated or misbranded. These eggs were either cold storage eggs not labeled as such as prescribed by statute, or they were sold under a "Fresh Egg" or "Fresh Western Egg" designation and were not fresh, or, in a few instances, were decomposed.

It is a strange fact that the public is satisfied to purchase cold storage eggs if they are sold under a "Fresh Egg" designation, but the public is prejudiced against cold storage eggs when sold and labeled as such. A great deal of this prejudice is fostered by the retail egg merchant, who will tell his customers upon inquiry that the eggs which he is selling are not cold storage eggs, but, when he ascertains that the customer is an inspector, he changes his story.

Elias B. Boyce, Assistant Chemist of the Division, carried out an interesting experiment relative to the change in the composition of eggs held in cold storage. On May 16, 1932, one case of eggs, containing thirty dozens, was purchased from a poultry dealer who ships eggs into the Boston market twice a week. It was estimated that the eggs were on the average a week old when received at the laboratory. These eggs were all candled on the day received and the size of the air cell outlined with pencil on the shell of each egg, and each egg was given a serial number for subsequent identification. Of these eggs, 351 had air cells not larger in diameter than that of a dime, and 9 others had air cells not larger than the diameter of a five cent piece. Two of the eggs showed blood spots, but the rest were apparently in first class condition. One dozen was analyzed on the day of receipt. The rest of the eggs were placed in a commercial cold storage warehouse at a temperature of 30° Fahrenheit and a relative humidity of 89 or more. At various intervals lots of 1 dozen each were removed from this case of eggs over a period of 48 weeks and were tested to determine the rate of change occurring during the storage period.

The following determinations were made:—ammonia content of the mixed egg by the method of Folin and Dennis; determinations of the apparent specific gravity of the entire egg; qualitative tests on the outside of the shell for potassium and chlorine; quantitative determination of the water soluble solids and the ash on the outside of the shell. The method of handling each dozen was as follows:—After the soluble solids had been washed from the outside of the egg, the specific gravity was determined by placing each egg in a series of salt solutions or alcohol-water mixtures of known specific gravity, varying from 0.800 to 1.080. These solutions were checked from time to time with a hydrometer and readjusted when necessary. The solutions were placed in beakers and each egg was placed in the solutions until it was found to just sink in one solution and float in another solution. The specific gravity of the egg was then calculated as the average of the gravities of these two solutions. The eggs were next broken out and placed in a mixer, two eggs at a time. A twenty gram sample of the mixture was used for the determination of the ammonia. This gave six different analyses for each dozen eggs.

The testing of the outside of the shell for potassium and chlorine, and the determination of the water soluble solids and water soluble ash of the shell was carried out to verify a published statement that during storage the potassium-chloride, which is naturally on the shell, passes from the outside to the inside of the shell. At the beginning of the experiment, the individual eggs showed considerable variation in their response to the qualitative tests for potassium and chlorine, and it was our belief that these eggs may have been washed before being delivered to the laboratory, which would of course interfere with these tests.

The determination of the water soluble solids and ash showed no appreciable difference from similar figures on eggs of similar age which had not been in storage. Because of this, the experiment was discontinued before the completion of the work.

The following table shows the ammonia content of the eggs; the date of determination; and the age of the eggs. The ammonia figure represents the average of the six analyses, each analysis being that of a sample obtained from two eggs. This table also contains the probable error. This should not be construed to mean the error of examination; instead, it should be construed to mean the probable variance in the composition of the different eggs involved in the six analyses. In general, this variance was low.

Our experience with eggs has shown that it is unusual for a fresh egg as defined in the dictionary to have an ammonia content exceeding 1.8 milligrams per 100 grams. The first dozen examined, which we estimate to have been one week old, showed an ammonia content of 1.46 milligrams per 100 grams. This figure did not reach 1.8 milligrams until the sixth week, that is to say, after five weeks in cold storage.

It is interesting to note that one dozen of the eggs after being eight weeks in storage had an ammonia content of 1.77, slightly under 1.8, but after thirteen weeks in storage, all the eggs had an ammonia content exceeding 2 milligrams per 100 grams. The highest figure was 2.88 milligrams after forty-seven weeks.

Changes in Ammonia Content and Specific Gravity of Eggs in Cold Storage

Date	Age of Eggs	Mg.NH$_3$	Probable Error	Specific Gravity
May 16	1 wk.	1.46	.10	1.074
" 23	2 wks.	1.65	.14	1.069
" 31	3 1/7 wks.	1.69	.04	1.069
June 6	4 wks.	1.76	.29	1.066
" 14	5 1/7 wks.	1.72	.22	1.065
" 21	6 1/7 wks.	1.86	.07	1.062
" 27	7 wks.	1.91	.08	1.064
July 5	8 1/7 wks.	1.98	.005	1.063
" 9	8 5/7 wks.	1.77	.03	
" 18	10 wks.	1.86	.04	1.060
" 28	11 3/7 wks.	2.11	.12	1.061
Aug. 1	12 wks.	1.94	.08	1.059
" 10	13 2/7 wks.	2.28	.09	1.055
" 17	14 2/7 wks.	2.32	.18	1.060
Sep. 8	17 3/7 wks.	2.31	.03	1.051
" 26	20 wks.	2.14	.03	1.049
Nov. 21	28 wks.	2.39	.08	1.040
Dec. 5	30 wks.	2.47	.09	1.039
" 14	31 2/7 wks.	2.38	.08	1.044
" 19	32 wks.	2.53	.18	1.040
Jan. 6	34 4/7 wks.	2.66	.08	1.038
" 9	35 wks.	2.26	.14	1.044
" 25	37 2/7 wks.	2.75	.08	1.038
Feb. 8	39 2/7 wks.	2.80	.14	1.031
" 21	41 1/7 wks.	2.56	.11	1.034
Mar. 6	43 wks.	2.63	.11	1.029
" 22	45 2/7 wks.	2.52	.20	1.020
Apr. 5	47 2/7 wks.	2.88	.12	1.015
" 17	49 wks.	2.75	.04	1.009

At the same time, another half crate of eggs was purchased at the same source and left in a warm storeroom in the laboratory from May 16 to August 17. The temperature conditions of this storeroom varied between 70° and 90° during that period. From time to time eggs were removed from this crate and examined in a similar manner to the examination of the eggs obtained from cold storage. In a period of about three weeks these eggs deteriorated to about the same extent as the eggs which had been kept for forty-eight weeks in cold storage. The following table shows the ammonia content and specific gravity of these eggs stored at a relatively high temperature.

Date	Age of Eggs	Ammonia	Specific Gravity
May 16	1 wk.	1.46	1.074
" 23	2 wks.	1.93	1.054
" 31	3 1/7 wks.	2.73	1.028
June 6	4 wks.	3.49	1.005
" 14	5 1/7 wks.	3.79	0.966
" 21	6 1/7 wks.	4.75	0.972
" 27	7 wks.	5.26	0.922
July 5	8 1/7 wks.	5.48	0.898
" 9	8 5/7 wks.	5.21	0.910
" 18	10 wks.	5.82	0.876
" 25	11 wks.	6.57	0.863
Aug. 1	12 wks.	6.51	0.871
" 10	13 2/7 wks.	7.58	below 0.830

An unusual number of meat products was collected during the year, there being a total of 1,820 such samples, of which 1,237 were sausages, 500 were Hamburg steak, and 70 were liver; and of these, 111 samples of sausages, 192 samples of Hamburg steak, and 20 samples of liver were adulterated.

The sale of decomposed meats was excessive this year, particularly in the case of cheap meat. The retail dealers stated they were obliged to sell cheap Hamburg steak because their competitors did; nevertheless, all the dealers denied that they sold meat which they knew was bad. In some instances the store manager would admit to the inspector in the store at the time of sale that the meat was bad, and subsequently in a few instances testified in court that in their opinion the meat was not bad at the time of sale.

In examining this meat for chemical decomposition we have adhered to the method which the department has used for years; namely, the relationship between the ammonia and the total nitrogen. Experience has shown that if this figure is 0.5 per cent or more the meat is perceptibly bad to the sense of smell. The examinations of good meat made during the year indicate that this figure is somewhat liberal and may be revised downwards without seriously interfering with the business of the retail meat dealers, at the same time being of advantage to the purchaser. Most of the good market meat ran from 0.20 per cent to 0.35 per cent. One sample of aged mutton, known to have been aged for at least three weeks, gave a figure of 0.39 per cent. The examination of livers and kidneys by this method showed practically the same figures if the articles were not decomposed, but with this type of meat the decomposition proceeded more rapidly than in the case of muscular fibre.

In carrying out this work the automobile was used extensively for transportation purposes, and the samples as soon as purchased were placed in a container in which there was a large quantity of solid carbon dioxide, commercially known as "dry ice." Under these conditions, such material could be transported from Western Massachusetts to Boston and arrive at the laboratory in a frozen condition. This naturally offsets any claims that the article had decomposed in transit.

A series of experiments was made as to the effect of sodium sulphite as a preservative. This material has been extensively used by the trade for the alleged purpose of preserving chopped meat. In carrying out the experiment as to the preservative action, meat was secured; passed through a meat chopper; and half the meat was mixed with 0.50 per cent anhydrous sodium sulphite. Portions of this meat were taken out for analysis and the balance placed in the ice chest. Each day samples were removed and examined. The ammonia-nitrogen ratio was plotted against time and it was ascertained that during a four-day period the sodium sulphite gave a five-hour advantage in delaying decomposition over the time of decomposition of the portion not so treated. This advantage is too slight to be of any commercial value.

There are two commercial reasons for using this chemical:—first, it gives the meat the appearance of freshly chopped meat; that is to say, the sulphite produces a red color by combining with some of the constituents of the meat; and in the second place it acts as a deodorizer of decomposed meat. A third advantage is due to the mode of preparation in the trade. The sodium sulphite is dissolved in water and the solution is then placed in a receptacle, such as a galvanized iron ash can or a large wooden tub, and fairly large pieces of meat are put into this solution and allowed to stay there until the solution is absorbed. This meat then in many instances furnishes the material for the freshly ground Hamburg, sometimes ground in the presence of the customer, and the ground-up meat when sold contains from 5 per cent to 7 per cent of added water. The representative of one company, who came in for a hearing, stated that the added water in the Hamburg steak was nothing to cause any undue criticism. It only amounted to about 700 pounds on each batch of Hamburg.

The sale of meat containing sulphites has been controlled by the regulations of the Department, which, by statute, must comply with those of the U. S. Department of Agriculture. That Department had a regulation providing that if sulphur dioxide were used in food, each package sold must be so labeled, and a regulation to that effect was adopted by this Department in 1917, after the change in the Massachusetts law which struck out the statutory provision providing for such labeling. At the last session of the Legislature, a bill was introduced, prohibiting the addition of this material to meat. A few weeks before the Act was to become a law, there was some newspaper publicity and certain manufacturers of beef sausages ascertained that this new law would interfere with their business. Consequently, they were instrumental in having another bill introduced, permitting the use of sodium sulphite to an extent of 0.1 per cent, provided that each package sold was so labeled. To this bill an emergency preamble was attached, and the bill became law one day after the prohibitory bill became a law. Operations under this statute are far preferable to procedure under the regulation.

The amount of sodium sulphite in the Hamburg steak samples upon which a determination was made varied from 0.01 per cent up to 1.31 per cent; the arithmetic average was 0.21 per cent; and the middle term of the series was 0.11 per cent; the geometric mean was 0.10 per cent. There were 42 samples labeled as to the presence of the preservative; there were 124 samples upon which the quantity of preservative was determined. There were 60 samples sold after July 7, containing less than 0.1 per cent of the preservative; and there were 45 such samples containing more than 0.1 per cent of the preservative. There were 19 samples found to contain added water. Of the samples which were decomposed when sold, 43 contained no preservatives and 39 contained sodium sulphite.

Sodium sulphite is to some extent used in certain types of sausages, the quantity on the whole being less than that in Hamburg steak because the meat content of the sausages is much less than the meat content of the Hamburg steak. The quantity of sodium sulphite in sausages varied between 0.01 per cent and 0.45 per cent; the geometric average was 0.077 per cent; and the median or middle term was 0.07 per cent.

The statute permits cereal in sausages to the extent of 2 per cent. The quantity of cereal is determined only when a qualitative test indicates the possibility of the starch content being high. There were 35 such samples examined, the starch varying from 0.70 per cent up to 4.62 per cent, with an average of 2.07 per cent. There were 14 of these samples above 2 per cent in starch.

There were 23 samples of sausages found to contain color; there were 40 samples containing sulphites and so labeled; and there were 5 samples which were found to be decomposed. This epidemic of the sale of decomposed meat and meat products began to show signs of abatement about the first of November.

Examination of Drugs

There were 151 drug samples collected, of which 8 were adulterated. These consisted of 3 samples of camphorated oil, which were slightly low in camphor; 2 samples labeled "Cottonseed Oil", which proved to be linseed oil, which samples have already been discussed under prosecutions; 2 prescriptions, which were not put up in conformance with the physicians' orders; and 1 sample of tincture of iodine slightly below the legal standard.

Conditions in the drug trade have improved materially. Thirty years ago at least 30 per cent of these samples would have been adulterated.

A summary of the drug statistics will be found in Table 6.

Examination of Pasteurization Establishments

There is a total of 637 pasteurization plants in Massachusetts. All but 49 of these were inspected during the year. These were located in 154 different towns. There were 27 towns not visited during the year, and in these towns there were in all 35 such establishments. There were 1,153 total inspections made.

A summary of the defects reported is as follows:—

Unsanitary conditions	73
No leak escape valve	60
(This does not necessarily constitute a defect, provided the effluent and influent pipes are disconnected during the holding period.)	
Operating without a license or failing to display license on the premises	63
Charts showing low temperature or short time of pasteurization	59
Charts not bearing the comparative readings of the recording and mercury thermometers	40
Charts not dated	18
Absence of recording thermometer	7
Leak escape plugged and effluent piping not disconnected	6

Ten plants went out of business during the year. The conditions on the whole are highly favorable and are an improvement over conditions reported during the prior three years.

COLD STORAGE

With the exception of the illegal sale of cold storage eggs, there were no serious violations of the cold storage law discovered during the year. One corporation attempted to operate a room in another storage warehouse and declined to take out a license. A case was entered against this corporation, but the corporation then applied for a license and the case was dismissed.

A summary of the extensions of time granted on goods in storage, as well as extensions refused, and a record of lots of food ordered removed from cold storage, will be found in Tables 7, 8, and 9.

Tables 10, 11, 12, and 13 contain the statistics on the amounts of food placed in storage and the amounts of food on hand in storage.

SLAUGHTERING INSPECTION

The usual routine work in connection with approval of nominees for the position of slaughtering inspector was carried out during the year. There were very few violations of the law, resulting in three prosecutions in one town for slaughtering in the absence of the inspector and for illegal application of the slaughtering stamp on the part of the inspector. These cases resulted in conviction.

A summary of the slaughtering inspections and confiscations will be found in Table 14.

INVESTIGATIONS UNDER THE MATTRESS LAW

Practically all the mattress factories were looked over during the year, and very few violations of the law were found. In fact, at no time has the mattress industry been running so nearly in accordance with the requirements of the law as during the past three years. There were six prosecutions, all of which resulted in conviction.

The following summary of the mattress work was prepared by Dr. Drury, one of the veterinary inspectors of the department, who has been assigned to do most of this work.

"In December, the first month of the last fiscal year, a general survey was made of all the mattress factories throughout the State.

Among the larger plants there was a prejudice against the red tag, and its use was barred in most of these well established places, thus eliminating any secondhand material from their products. The smaller concerns, catering to the cheaper trade, used principally secondhand material, and the red tag in these plants was conspicuous.

The business spurt early in 1933 among the bedding trade brought few complaints to this Division, which may have been due to our stringent law, together with the fear of losing the right to display the blue eagle under the N. R. A.

During another survey made of the factories and stores in September, it was found that several of the plants were beginning to transgress. A complaint was received from Springfield that one plant was using secondhand material. The Bay State Bedding Company of Springfield was haled into the Springfield Court in October, charged with using mill sweepings improperly labeled. The firm claimed the material came from Connecticut, but this could not be proven. After a hearing, a plea of "nolo" was entered and a fine of fifteen dollars was paid.

Stores were visited in Springfield and Holyoke and many mattresses opened to determine the type of filling, most of these mattresses being labeled with white tags which called for new material only. In one Holyoke bedding store red tags had been removed from mattresses with secondhand filling. The owner, Louis Pallett, was summoned into Court and paid a fine of ten dollars for offering these mattresses for sale.

In November, the Merrimac Mattress Company of Haverhill was found mislabeling mattresses, and after a lengthy hearing before Judge Winn was fined fifteen dollars.

In Lawrence about the same time, two brothers, Morris and Samuel Milstone, each conducting a mattress plant, were found to be violating the "secondhand" law. Morris had manufactured a mattress of secondhand material and attached a new white tag. His brother, engaged in remaking mattresses, used secondhand material and also affixed white tags. Each paid a fine of ten dollars in the Lawrence Court. The plants of the above named defendants were later inspected, but no further violations could be noted.

A Woonsocket, Rhode Island, firm, which had shipped mattresses into Fall River and New Bedford early in 1931 and caused the prosecution of four bedding dealers, was again checked up and found to be still playing loose with our bedding laws. A visit to a Webster furniture store early in December resulted in the finding of "100% Kapok Mattress" which when opened proved to contain about 40 per cent cotton. The cotton was very similar in color to the kapok and was mixed by a blowing machine, which almost entwined the fibers of the kapok with those of the cotton. The owner of the furniture store was surprised at this fraud as he stood by the inspector when the mattress was opened. Notwithstanding this, the inspector was able at a later date to visit this same store and find a cotton linter mattress marked "New Material" had been delivered by the same Rhode Island firm since his last visit. When this cotton linter mattress had been opened it was found to contain the rankest of secondhand used cotton. The Diamond Mattress Company of Woonsocket, Rhode Island, was proceeded against on a criminal complaint in the Webster Court. The corporation hesitated about coming into this State, giving as a reason that the penalty might be away out of proportion to the offense committed. Upon the advice of counsel, a representative of the corporation came into the Webster Court January 18, 1934, and defended the complaint, the firm being charged with unlawfully selling secondhand material in Massachusetts. A fine of $75 was imposed by Judge Rieutord. The furniture dealer was also charged with having secondhand, improperly labeled mattresses in his possession, but this case was dismissed for want of prosecution.

In all sections of the State, furniture and bedding stores have been visited and mattresses bearing white tags, indicating new material, were opened in order to check on the contents. In this way it could be learned definitely the type of product being sold by all manufacturers. Among the mattresses opened only four were found to be improperly labeled; one in Attleboro came from a Rhode Island firm by mistake; a Lynn firm shipped mattresses to Rhode Island, which is still without a bedding law, and while the material was classified as secondhand in this State, a "new" tag was attached, but the firm, in order to protect itself, wrote in ink the name of the Rhode Island furniture firm across the tag. These mattresses were later taken into a Worcester furniture store, where it was found necessary to affix a red tag.

A check-up of bedding throughout the State shows that buyers are better protected than at any time in the past eighteen years since the law was placed on our statute books. The larger and better established bedding stores in all sections of the State are opposed to cheap bedding in any form and will not countenance any deceitful practices toward the buyer. As a result, the more reputable dealers are finding their business on the increase despite the depression. The increased use of the innerspring mattress is no small factor against the use of secondhand material. A few manufacturers have resorted to the use of secondhand burlap covering the spring units at a net profit of twenty-five cents by this practice. The discovery by the dealers of this practice has been very costly to these manufacturers in the loss of trade. All furniture dealers have welcomed the visits of the inspectors and have cooperated in every way. All seemed eager to determine at first hand the quality of goods they were receiving. All the bedding dealers proclaim loudly that they buy with confidence from the manufacturer and rely on him to comply with the law. This is not true, however, in all cases, notwithstanding the fact that no conspiracy between the dealer and manufacturer can be proven. The dealer, however, takes every precaution to see that the manufacturer will "hold the bag" and "take the rap" when any trouble arises. There is very little opportunity to prove any comradeship between the illegal manufacturer and the disreputable dealer.

One manufacturer comparatively new in the trade affixed a red tag to his secondhand mattresses, but carefully avoided using the word "secondhand." On each mattress that this tag was used there was also attached a white tag bearing the words "new material" and the name of the furniture dealer. When questioned, the manufacturer stated that the company desired both tags. He promptly removed the white tag when the bedding law was quoted to him. The furniture company claimed the white tag was used only for firm identification."

SUGGESTIONS REGARDING OUT-OF-STATE PASTEURIZING ESTABLISHMENTS

There is one phase of the milk situation which has not been covered by legislation, and to which serious consideration should be given.

There is a certain amount of milk sold in Massachusetts which is pasteurized in establishments located elsewhere than within the Commonwealth. Some of these plants are located within a few miles of the State's borders and such plants can be readily inspected and if the conditions are not in conformance with the regulations of the Department the local milk inspector where the milk is sold can with propriety refuse a milk license to the proprietor of the plant, or, if a license has been issued, he may revoke it unless conditions at the plant are made to comply with the requirements of the regulations. There are a few plants located at considerable distance from the State's borders, where milk is pasteurized for sale in Massachusetts. Periodic visits to some of these plants are made by the milk inspectors of the cities where the milk is sold, and occasional visits to these and other plants are made by employees of this Department when on vacation. It can be stated to the advantage of these plants that those which have been seen are being operated as required by the departmental regulations. Nevertheless, it would be advisable to consider the enactment of a statute requiring registration of such plants after payment of a fee, provided that upon inspection the plant was found to be in conformance with the departmental regulations, with a further requirement that if an inspection showed noncompliance, the registration could be suspended or revoked. The fee should be sufficient to cover the cost of inspection, and as there are quite a number of such plants, this fee need not be excessive.

Table 15 gives the list of confiscations made by the inspectors of the Department, and Table 16 gives a summary of the bakery inspections.

Table 17 contains the results of examinations of liquor samples.

TABLE 1. — *Prosecutions for Violations of the Food and Drug Laws*

For Sale of Milk not of Good Standard Quality

NAME	ADDRESS	COURT	DATE	RESULT
Castine, Fred J.	Orange	Orange	July 21, 1933	Conviction
Collins, Alice G.	Woburn	Woburn	July 25, 1933	Conviction
Cyr, Arthur W.	Salem	Salem	Nov. 17, 1933	Conviction
David, Charles A.	Springfield	Springfield	Feb. 8, 1933	Conviction
Dilyannis, Drauffis	Hull	Hingham	Aug. 11, 1933	Conviction
Dobrosielski, Adam	Salem	Salem	May 26, 1933	Conviction
Dobrowski, Joseph	Adams	Adams	Nov. 14, 1933	Conviction
Geokos, Peter	Cambridge	Cambridge	Feb. 20, 1933	Conviction
Mahar, Hermit	Pittsfield	Pittsfield	Apr. 4, 1933	Conviction
O'Connor, Charles	North Attleboro	Attleboro	Feb. 10, 1933	Conviction
Panis, Basil	Cambridge	Cambridge	Feb. 20, 1933	Conviction
Phillips, George	Salisbury	Amesbury	Aug. 17, 1933	Conviction
Quong, Charles	Athol	Athol	Aug. 14, 1933	Conviction
Rioux, F. Ernest	North Attleboro	Attleboro	Feb. 10, 1933	Conviction
Secaras, James	Pittsfield	Pittsfield	Apr. 4, 1933	Conviction
Shea, D. William J.	Oak Bluffs	Edgartown	Sept. 6, 1933	Conviction
Soares, John	Taunton	Taunton	Oct. 10, 1933	Conviction
Sousa, Joseph P.	Cambridge	Cambridge	Feb. 20, 1933	Conviction
Walker, Joseph L.	Hyannis	Barnstable	Sept. 15, 1933	Conviction

For Sale of Milk from Which a Portion of the Cream Had Been Removed

NAME	ADDRESS	COURT	DATE	RESULT
Bennett, Matthew J.	Burlington	Woburn	Oct. 13, 1933	Discharged
Dutchland Farms, Inc.	Brockton	Stoughton	Oct. 10, 1933	Conviction
Koopman, Thomas S.	Northbridge	Whitinsville	May 31, 1933	—[1]
McCarron, Mark E.	Woburn	Woburn	Aug. 21, 1933	Conviction
Nimmo, Charles	Lawrence	Lawrence	May 22, 1933	Conviction
Peret, Stanley	Chicopee	Chicopee	May 19, 1933	Conviction
Rauh, Nicholas	Wilbraham	Palmer	Dec. 13, 1932	Conviction
Reed, Andrew C.	Danvers	Salem	Sept. 15, 1933	Conviction
Superchi, Oliver	Orange	Athol	Aug. 14, 1933	Conviction

[1] Dismissed for want of prosecution.

For Sale of Milk Containing Added Water

NAME	ADDRESS	COURT	DATE	RESULT
Badger Farms Creameries	Newburyport	Newburyport	June 6, 1933	Conviction
Carreau, Henry C.	East Douglas	Whitinsville	May 31, 1933	Conviction[1]
Clark, Frank G.	Huntington	Northampton	May 2, 1933	Conviction
Conto, Joseph	East Taunton	Taunton	Mar. 2, 1933	Conviction
Karpinski, Frank	North Reading	Woburn	Sept. 19, 1933	Discharged
Maslowski, Adam	Newton Junction, N.H.	Haverhill	Nov. 28, 1933	Conviction
O'Connell, Patrick W.	East Taunton	Taunton	Mar. 2, 1933	Conviction[1]
O'Connell, Patrick W.	East Taunton	Taunton	Mar. 2, 1933	Conviction
Yeanecopolos, James	Berkley	Fall River	June 8, 1933	Conviction

Selling Unpasteurized Milk as Pasteurized

August, Hector & Joaquin Palatino	Ludlow	Ludlow	Feb. 28, 1933	Discharged
Catherwood, Robert	Lowell	Lowell	Jan. 11, 1933	Conviction
Charbonneau, Elizabeth	Lowell	Lowell	Dec. 28, 1932	Conviction[2]
Farmers' Dairy, Inc.	New Bedford	New Bedford	Mar. 2, 1933	Conviction
Feldman, Harry	Everett	Malden	Nov. 15, 1933	Conviction[3]
Fila, Joseph	Thorndike	Palmer	Dec. 29, 1932	Conviction
Fortier, Sylvio	Fall River	Fall River	Mar. 10, 1933	Conviction
Frye, B. M., Inc.	Leominster	Leominster	Sept. 25, 1933	Conviction
Hancock, Edgar W.	Wakefield	Malden	June 22, 1933	Conviction
Hancock Milk Company	Wakefield	Malden	June 22, 1933	Conviction
Holyoke Producers' Dairy Company	Holyoke	Holyoke	Mar. 9, 1933	Conviction
Houghton, Allen W.	North Amherst	Northampton	June 6, 1933	Conviction
Lane, Maynard W.	Ipswich	Ipswich	July 22, 1933	Conviction
Rogers, Joseph A.	Haverhill	Haverhill	Feb. 8, 1933	Conviction
Sheehan, John	Holyoke	Holyoke	May 24, 1933	Conviction
Sudol, John	Groveland	Haverhill	June 1, 1933	Conviction
Sumner, G. Fred	South Attleboro	Attleboro	Sept. 5, 1933	Conviction
Texeira, John M.	Fairhaven	New Bedford	June 27, 1933	Discharged

[1] Appealed.
[2] Placed on probation for 2 years.
[3] Guilty; placed on probation for one year.

For Violation of Pasteurization Law and Regulations

Beland, Adelard	Lowell	Lowell	Dec. 28, 1932	Conviction[1]
Bookless, Max	Pittsfield	Pittsfield	May 18, 1933	Conviction
Charbonneau, Elizabeth	Lowell	Lowell	Dec. 28, 1932	Conviction[1]
Clifford, Owen	Ludlow	Springfield	May 3, 1933	Conviction
Cockery, John J.	Cambridge	Cambridge	July 20, 1933	Discharged
Crane, James B.	Leominster	Leominster	Sept. 25, 1933	Conviction
Crane, James B.	Leominster	Leominster	Apr. 21, 1933	Conviction
Feldman, Harry	Everett	Malden	Nov. 15, 1933	Conviction
Feldman, Harry	Everett	Malden	Nov. 15, 1933	Conviction
Forest Lake Dairy Co. Inc.	Palmer	Palmer	Sept. 20, 1933	Conviction
Forest Lake Dairy Co. Inc.	Palmer	Palmer	Sept. 20, 1933	Conviction
Fortier, Sylvio	Fall River	Fall River	Mar. 10, 1933	Conviction
Hancock Milk Company	Wakefield	Malden	June 22, 1933	Conviction
Karafiles, Antonio	Chelmsford	Lowell	June 16, 1933	Conviction
Laipson, Oscar	Worcester	Worcester	Dec. 29, 1932	Conviction
Lane, Maynard W.	Ipswich	Ipswich	July 22, 1933	Conviction
Lyndonville Creamery Association	Watertown	Waltham	May 20, 1933	Discharged
Magee, Albert T.	Leominster	Leominster	Apr. 21, 1933	Conviction
Magee, Albert T.	Leominster	Leominster	Apr. 21, 1933	Conviction
Mallory, F. B., Inc.	Springfield	Springfield	Apr. 7, 1933	Conviction
Mioduszewski, Lottie	North Saugus	Saugus	Jan. 7, 1933	—[2]
Mioduszewski, Lottie	North Saugus	Saugus	Jan. 7, 1933	—[2]
Model Dairy, Inc.	Pittsfield	Pittsfield	Mar. 8, 1933	Conviction
Model Dairy, Inc.	Pittsfield	Pittsfield	Mar. 8, 1933	Conviction
Nook Farm Corporation	Plymouth	Plymouth	June 21, 1933	Conviction
Nook Farm Corporation	Plymouth	Plymouth	June 21, 1933	Conviction
Oliveira, Julio	Fall River	Fall River	Aug. 14, 1933	Conviction[3]
Richardson, Hazen K.	Middleton	Salem	June 29, 1933	Conviction
Rogers, Joseph A.	Haverhill	Haverhill	Feb. 8, 1933	Discharged
Sudol, John	Groveland	Haverhill	June 1, 1933	Conviction
Sumner, G. Fred	South Attleboro	Attleboro	Sept. 5, 1933	Conviction
Texeira, John M.	Fairhaven	New Bedford	June 27, 1933	Discharged
Texeira, John M.	Fairhaven	New Bedford	June 27, 1933	Conviction
Watt, David M.	Barre	Barre	Mar. 23, 1933	Conviction
Watt, David M.	Barre	Barre	Mar. 23, 1933	Conviction

[1] Placed on probation for 2 years.
[2] On file without finding.
[3] Placed on probation until February 21st, 1934.

For Violation of Grade A Regulations

Herlihy Bros., Inc.	Somerville	Malden	June 9, 1933	Conviction
Herlihy Bros., Inc.	Somerville	Hingham	Oct. 6, 1933	Conviction
Kirschner, Joseph W.	Pittsfield	Pittsfield	Aug. 3, 1933	Conviction
Mallory, F. B., Inc.	Springfield	Springfield	Apr. 7, 1933	Conviction
McAdams Bros., Inc., J. F.	Chelsea	Chelsea	Apr. 27, 1933	Conviction
Stinson, Richard A.	Uxbridge	Milford	Apr. 14, 1933	Conviction

Misbranding of Milk

Kirschner, Joseph W.	Pittsfield	Pittsfield	Aug. 3, 1933	Conviction

BUTTER
(Low Standard)

Armour & Company	Springfield	Springfield	Mar. 31, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Lawrence	Lawrence	Dec. 27, 1932	Dismissed
Atlantic & Pacific Tea Co., Great	Springfield	Springfield	Jan. 31, 1933	Conviction
Swift & Company	Springfield	Springfield	Feb. 28, 1933	Conviction

For Sale of Adulterated or Misbranded Foods Other than Milk and Milk Products

CLAMS
(Sewage Polluted)

Brown, Rufus S.	Salisbury	Salem	Feb. 3, 1933	Conviction
Chilles, James	Lynn	Lynn	June 6, 1933	Conviction
Claxton, Joseph	Ipswich	Boston	Apr. 11, 1933	Discharged
Davis, Fred	Gloucester	Boston	Jan. 26, 1933	Conviction
Drape's Fish Market	Fall River	Fall River	July 24, 1933	Discharged
Figueredo, Antone	Cohasset	Quincy	Aug. 3, 1933	Conviction
Finn Brothers	Boston	New Bedford	Nov. 22, 1933	Conviction
Hamilton Company, R. S.	Boston	South Boston	Dec. 15, 1932	Conviction
Harris, Walter H.	Newburyport	Boston	Dec. 11, 1932	Conviction
O'Brien, William F.	Salem	Salem	Feb. 3, 1933	Conviction
Reed, Royal	Revere	Chelsea	Aug. 11, 1933	Conviction
Rich, John W.	Boston	South Boston	Dec. 15, 1932	Conviction
Savage Jr., Carl	Rowley	Boston	Oct. 10, 1933	Conviction[1]
Smart, Albert	Lynn	Boston	July 20, 1933	Dismissed
Smart, Philip	Lynn	Salem	Feb. 3, 1933	Conviction
Whitman, Ward & Lee	Boston	Boston	July 25, 1933	Discharged
Wilcox, William J.	Chelsea	South Boston	Dec. 15, 1932	Conviction

VANILLA EXTRACT
(Contained coumarin)

Berlin, Leo	Chelsea	Chelsea	May 22, 1933	Conviction
Cohen, Samuel	Roxbury	Roxbury	May 9, 1933	Conviction
Di Pietro, Joseph	East Boston	East Boston	May 11, 1933	Conviction
Frodema, Joseph	Springfield	Springfield	May 24, 1933	Conviction
Kupperstein, Barney	Roxbury	Roxbury	May 9, 1933	Conviction
Roma Extract Co., Inc.	Boston	Boston	Sept. 14, 1933	Conviction
Siegel, Albert	Cambridge	Cambridge	July 13, 1933	Conviction

HAMBURG STEAK
(Selling, or offering for sale, meat containing sodium sulphite in violation of the regulations of the Department of Public Health)

Abramowitz, Louis	Cambridge	Cambridge	Dec. 7, 1932	Conviction
Alter, William	Roxbury	Roxbury	Dec. 19, 1932	Conviction
Berkman, Samuel	Roxbury	Roxbury	July 18, 1933	Discharged
Cambridge Provision Co., Inc.	Cambridge	Cambridge	Dec. 16, 1932	Conviction
Fishman, Nathan	Allston	Brighton	May 1, 1933	Conviction
Gallis, David	Boston	Boston	May 16, 1933	Conviction
Halpern, Joseph	Haverhill	Haverhill	Feb. 1, 1933	Conviction
Kaplan, John	Woburn	Woburn	Apr. 4, 1933	Conviction
Kaufman, Abraham	Chelsea	Chelsea	Mar. 14, 1933	Conviction
Keimach, Philip	Chelsea	Chelsea	Mar. 1, 1933	Conviction
Mades Com. Inc., M. M.	Everett	Malden	Dec. 15, 1932	Conviction
Medelbaum, Aaron	Chelsea	Chelsea	Mar. 1, 1933	Conviction
Mezikolsky, William	Chelsea	Chelsea	Mar. 14, 1933	Conviction
Rice, Frank H.	Greenfield	Greenfield	Jan. 19, 1933	Conviction
Risman, Samuel	Dorchester	Dorchester	Dec. 14, 1932	Conviction
Rolka, Anthony	Chelsea	Chelsea	Jan. 17, 1933	Conviction
Rudkosky, Andrew	Chelsea	Chelsea	Jan. 17, 1933	Conviction
Simon, Harry	Dorchester	Dorchester	Dec. 29, 1932	Conviction
Spivack, Herman	Chelsea	Chelsea	Mar. 14, 1933	Conviction
Stolzberg, Benjamin	Haverhill	Haverhill	Feb. 1, 1933	Conviction

[1] Appealed.

HAMBURG STEAK
(Violation of the law relative to use of sodium sulphite in meat and meat products)

Berger, Samuel	Lynn	Lynn	Sept. 14, 1933	Conviction
Chamberlain & Co., Inc.	Boston	Boston	Sept. 27, 1933	Conviction
Cohen, Julius	Everett	Malden	Sept. 7, 1933	Conviction
Herman, Nathan	New Bedford	New Bedford	Oct. 4, 1933	Conviction
Hollis, Frank	Chelsea	Chelsea	Sept. 12, 1933	Conviction[1]
Irons, Fred L.	Malden	Malden	Oct. 16, 1933	Conviction
Libowitz, Morris	Lawrence	Lawrence	Sept. 12, 1933	Conviction
Shawachman, Morris	Chelsea	Chelsea	Sept. 12, 1933	Conviction

[1] Appealed.

HAMBURG STEAK
(Contained added water)

Abrams, Lewis	Cambridge	Cambridge	July 13, 1933	Conviction
Alpert, Nathan	Boston	Boston	May 10, 1933	Conviction
Chamberlain & Co., Inc.	Boston	Boston	Sept. 27, 1933	Conviction
Fishman, Nathan	Allston	Brighton	May 2, 1933	Conviction
Hirsch, Max	Allston	Brighton	Oct. 24, 1933	Conviction
Kaizer, Celia	Chelsea	Chelsea	Oct. 2, 1933	Discharged
Libowitz, Morris	Lawrence	Lawrence	Sept. 12, 1933	Conviction
Lisman, Isaac	Lowell	Lowell	Oct. 30, 1933	Discharged
Marks, Abraham A.	Lynn	Lynn	Mar. 28, 1933	Conviction
Rozen, Abraham	Boston	Boston	Aug. 15, 1933	Conviction
Stolzberg, Benjamin	Haverhill	Haverhill	Sept. 11, 1933	Discharged

MAPLE SYRUP
(Contained cane sugar)

Fred F. Field Holsteins Dutchland Farms Trustees	Newtonville	Newton	June 7, 1933	Conviction
Papaleka, John	Arlington	Cambridge	July 20, 1933	Conviction
Woolworth Co., F. W.	Boston	Boston	Apr. 6, 1933	Conviction

TABLE 1. — *For Sale of Adulterated or Misbranded Foods Other than Milk and Milk Products* — Concluded

MARSHMALLOW

(Contained benzoic acid)

Three Millers Company	Boston	Boston	Sept. 6, 1933	Conviction

OLIVE OIL

(Contained cottonseed oil)

Panokas, Nicholas	Lynn	Lynn	Jan. 18, 1933	Discharged
Stergis, Stravos	Lynn	Lynn	Jan. 18, 1933	Conviction

SAUSAGE

(Contained starch in excess of 2 per cent)

Berlo, Peter L.	South Boston	South Boston	June 30, 1933	Conviction
Berlo, Peter L.	South Boston	Boston	Jan. 26, 1933	Conviction
Bradbury, Harry L.	Lawrence	Lawrence	Dec. 2, 1932	Discharged
Brogi, Victor	Taunton	Taunton	Feb. 3, 1933	Conviction
Brogi, Victor	Taunton	Taunton	Feb. 3, 1933	Conviction
Obartuck, John	Gilbertville	Hardwick	Mar. 3, 1933	Conviction
Stavely, Henry	Fitchburg	Fitchburg	Feb. 9, 1933	Conviction

SAUSAGE

(Contained a compound of sulphur dioxide not properly labeled)

Alpert, Nathan	Boston	Boston	Feb. 21, 1933	Conviction
Berlo, Peter L.	South Boston	Roxbury	Jan. 30, 1933	Conviction
De Rosa, Charles	Boston	Boston	Feb. 21, 1933	Conviction
Freni, John	Boston	Boston	Mar. 3, 1933	Conviction
Gloria Chain Stores, Inc.	Boston	Boston	May 10, 1933	Conviction
Maggipant, Stefano	Springfield	Springfield	Mar. 31, 1933	Conviction
Pesecetta, Phillip	Springfield	Springfield	Mar. 31, 1933	Conviction
Rubin, Morris	Chelsea	Boston	Feb. 21, 1933	Conviction
Sawelsky, Louis	South Boston	South Boston	July 10, 1933	Conviction
Zambello, Frank	East Boston	East Boston	Feb. 28, 1933	Conviction

SAUSAGE

(Contained added color)

Balkus Sausage & Provision Co.	Lynn	Stoughton	June 21, 1933	Conviction
Colonial Provision Co., Inc.	Boston	Boston	Apr. 27, 1933	Conviction
First National Stores, Inc.	Salem	Salem	Apr. 14, 1933	Conviction
Hummer, Frank	Pittsfield	Pittsfield	May 3, 1933	Conviction
Neuhart, Julius	Lawrence	Lawrence	May 8, 1933	Conviction
New England Provision Co.	Boston	South Boston	Mar. 22, 1933	Conviction
New England Provision Co.	Boston	Boston	Apr. 12, 1933	Conviction
Springfield Provision Co.	Chicopee	Chicopee	May 12, 1933	Conviction
U. & S. Beef & Provision Co., Inc.	Pittsfield	Pittsfield	May 18, 1933	Conviction
Veloza, James V.	Fall River	Fall River	June 15, 1933	Conviction
Wohrle, John	Pittsfield	Pittsfield	May 3, 1933	Conviction

SMOKED SHOULDER

(Contained maggots)

Economy Grocery Stores Co.	Billerica	Lowell	Aug. 18, 1933	—[1]

[1] Continued without finding for one year.

VINEGAR

(Low standard)

Labbe, Louis P.	Fall River	Fall River	Dec. 30, 1932	Conviction
Leal, John	East Providence, R. I.	Fall River	Dec. 30, 1932	Conviction
Pure Products Co., Inc.	West Springfield	Springfield	Feb. 3, 1933	Conviction
Pure Products Co., Inc.	West Springfield	Holyoke	Feb. 16, 1933	Conviction
Pure Products Co., Inc.	West Springfield	Springfield	Feb. 28, 1933	Conviction
Pure Products Co., Inc.	West Springfield	Springfield	Feb. 28, 1933	Conviction

For Sale of Decomposed Food

BUTTER

Atlantic & Pacific Tea Co., Great	Lawrence	Lawrence	Dec. 27, 1932	Conviction

EGGS

Cohen, Benjamin	Chelsea	Salem	Dec. 24, 1932	Discharged
Czerwonka, William	Holyoke	Holyoke	Jan. 4, 1933	Conviction
Dewire & Son Co., T. A.	Somerville	Somerville	Feb. 20, 1933	Conviction
D'Angelo, Guiseppe	Roxbury	Roxbury	Dec. 9, 1932	Conviction
Economy Grocery Stores	Medford	Malden	Jan. 24, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Greenfield	Greenfield	Feb. 7, 1933	Conviction
Kronick, Henry	North Adams	North Adams	Dec. 30, 1932	Conviction
Marcinek, John	Thorndike	Palmer	Dec. 13, 1932	Conviction
White, Samuel	Winthrop	East Boston	Mar. 9, 1933	Conviction
Winer Company, M.	Revere	Chelsea	Dec. 17, 1932	Conviction

FLANK BEEF

Brockelman Bros., Inc.	Gardner	Gardner	Sept. 28, 1933	Discharged

For Sale of Decomposed Food — Continued

HAMBURG STEAK

Abelson, Samuel	Worcester	Worcester	Oct. 31, 1933	Conviction
Alpert, Hyman	Boston	Boston	Sept. 20, 1933	Conviction
Andelman, Abraham	Cambridge	Cambridge	Nov. 16, 1933	Conviction
Andrews, Samuel	Waltham	Cambridge	Mar. 20, 1933	Conviction
Andrews, Samuel	Waltham	Waltham	Mar. 1, 1933	Conviction[1]
Atlantic & Pacific Tea Co., Great	Worcester	Worcester	June 23, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Gardner	Gardner	Aug. 10, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Pittsfield	Pittsfield	Sept. 12, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Leominster	Leominster	Sept. 18, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Fitchburg	Fitchburg	Sept. 21, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Fitchburg	Fitchburg	Sept. 21, 1933	Conviction
Atlantic & Pacific Tea Co., Great	North Attleboro	Attleboro	Oct. 5, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Waltham	Waltham	Oct. 13, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Cambridge	Cambridge	Nov. 1, 1933	Conviction
Berger, Samuel	Lynn	Lynn	June 15, 1933	Conviction
Berkman, Samuel R.	Roxbury	Roxbury	Oct. 27, 1933	Conviction[1]
Berkman, Samuel R.	Roxbury	Roxbury	Nov. 10, 1933	Conviction
Brockelman Bros., Inc.	Worcester	Worcester	Sept. 22, 1933	Conviction
Brockelman Bros., Inc.	Worcester	Worcester	Sept. 22, 1933	Conviction
Brockelman Bros., Inc.	Fitchburg	Fitchburg	Sept. 26, 1933	Conviction
Brockelman Bros., Inc.	Gardner	Gardner	Sept. 28, 1933	Discharged
Brockelman Bros., Inc.	Leominster	Leominster	Oct. 9, 1933	Conviction
Cambridge Provision Co., Inc.	Cambridge	Cambridge	Dec. 16, 1932	Conviction
Chamberlain & Co., Inc.	Boston	Boston	Sept. 27, 1933	Dismissed
Consumers Provision Stores, Inc.	Worcester	Worcester	June 23, 1933	Conviction
Corey, Arthur	Lawrence	Lawrence	Nov. 14, 1933	Conviction[1]
Economy Grocery Co.	Greenfield	Greenfield	Nov. 22, 1933	Conviction
Economy Grocery Co.	Greenfield	Greenfield	Nov. 22, 1933	Conviction
Gillette, Israel	Worcester	Worcester	Nov. 6, 1933	Conviction
Goldkrand, Hyman	Medford	Malden	Oct. 5, 1933	Nol Prossed
Grand Union Co.	Pittsfield	Pittsfield	Sept. 12, 1933	Conviction
Greenbaum, Nathan	Amesbury	Amesbury	Sept. 8, 1933	Conviction
Gross, Benjamin	Roxbury	Roxbury	Nov. 10, 1933	Conviction
Growers Outlet, Inc.	Holyoke	Holyoke	Sept. 29, 1933	Conviction
Halpern, Samuel	Westborough	Westborough	Nov. 17, 1933	Discharged
Herman, Nathan	New Bedford	New Bedford	Oct. 4, 1933	Conviction
Hirsch, Max	Allston	Brighton	Oct. 24, 1933	Conviction
Irons, Fred S.	Malden	Malden	Oct. 16, 1933	Conviction
Israel, Barney	New Bedford	New Bedford	Nov. 22, 1933	Conviction
Kaizer, Celia	Chelsea	Chelsea	Oct. 2, 1933	Discharged
Kaller, Phillip	New Bedford	New Bedford	Oct. 17, 1933	Conviction
Kessler, Keve	Malden	Malden	Mar. 21, 1933	Conviction
Kravitz, Robert	New Bedford	New Bedford	Oct. 17, 1933	Conviction
Kronick, Julius	North Adams	North Adams	Nov. 28, 1933	Conviction
Levy, Jack	Chelsea	Chelsea	Sept. 12, 1933	Discharged
L'Heureux, Henry E.	Salem	Salem	Nov. 17, 1933	Conviction
Libowitz, Morris	Lawrence	Lawrence	Sept. 12, 1933	Conviction
Louis Market, Inc.	Worcester	Worcester	Oct. 6, 1933	Conviction
Mades Co., Inc., M. M.	Lynn	Lynn	June 8, 1933	Conviction
Marienberg, Morris	Boston	Boston	Sept. 20, 1933	Conviction
Mass. Mohican Co.	Waltham	Waltham	Oct. 25, 1933	Conviction
Mendelbaum, Aaron	Chelsea	Chelsea	Sept. 12, 1933	Discharged
Mindick, Mitchell	Worcester	Worcester	July 5, 1933	Conviction
Moro, Enrico	Milford	Milford	Nov. 24, 1933	Conviction
Oxman, Harold	Malden	Malden	Nov. 15, 1933	Conviction
Racoff, Hyman	Roxbury	Roxbury	Nov. 23, 1933	Conviction
Rams, Julius E.	Lee	Lee	Oct. 25, 1933	Conviction
Reinholtz, Joseph	Boston	Boston	Sept. 20, 1933	Conviction
Ross, Irving	Allston	Brighton	Feb. 24, 1933	Conviction
Sawyer, Morris	Taunton	Taunton	Nov. 7, 1933	Conviction
Seaman, John	New Bedford	New Bedford	Oct. 17, 1933	Conviction
Siegal, Louis	Roxbury	Roxbury	Nov. 10, 1933	Conviction
Siegal, Louis	Roxbury	Roxbury	Nov. 10, 1933	Conviction
Solomon, Benjamin	Greenfield	Greenfield	Nov. 22, 1933	Conviction
Solomon, Isadore	Gardner	Gardner	Aug. 10, 1933	Conviction
Steinberg, James A.	Worcester	Worcester	Apr. 7, 1933	Conviction
Stolzberg, Benjamin	Haverhill	Haverhill	Sept. 11, 1933	Discharged
Tessier, Orphir	Holyoke	Holyoke	Sept. 15, 1933	Conviction
Weinstein, Harry	Waltham	Waltham	Oct. 16, 1933	Conviction
White, Max	Boston	Boston	Sept. 20, 1933	Conviction

[1] Appealed.

For Sale of Decomposed Food — Concluded

LIVER

Atlantic & Pacific Tea Co., Great	Indian Orchard	Springfield	Jan. 31, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Pittsfield	Pittsfield	Sept. 12, 1933	Conviction
Atlantic & Pacific Tea Co., Great	Worcester	Worcester	Oct. 3, 1933	Conviction
Brockelman Bros., Inc.	Worcester	Worcester	Sept. 22, 1933	Conviction
Charnas, Joseph	Roxbury	Roxbury	Dec. 19, 1932	Conviction
Consumers Provision Co.	Worcester	Worcester	Sept. 8, 1933	Conviction
Cowddaire, William H.	Attleboro	Attleboro	Oct. 5, 1933	Conviction
Dakin & Co., H. L.	Worcester	Worcester	Dec. 30, 1932	Conviction
Hirsch, Max	Allston	Brighton	Oct. 24, 1933	Conviction
Hixon & Co., Inc., Warren	Lynn	Lynn	May 19, 1933	Conviction
Seigal, Louis	Roxbury	Roxbury	Nov. 10, 1933	Conviction

PIG KIDNEYS

Armour & Co.	Boston	Boston	Oct. 6, 1933	Conviction
Belkins, Max	Boston	Boston	Oct. 6, 1933	Conviction

PORK CHOPS

Atter Brothers	Gardner	Gardner	Aug. 10, 1933	Conviction

SAUSAGE

Gold, Benjamin	Malden	Malden	Apr. 24, 1933	Conviction
Gold, Benjamin	Malden	Malden	Apr. 24, 1933	Conviction
Green Chain Stores, Inc., H. L.	Pittsfield	Pittsfield	Nov. 23, 1933	Conviction
Kessler, Keve	Malden	Malden	May 1, 1933	Conviction
Kessler, Keve	Malden	Malden	May 1, 1933	Conviction
Poretti, Antony	Waltham	Waltham	Mar. 1, 1933	Conviction
Richton, Samuel	North Adams	North Adams	Nov. 28, 1933	Conviction
Touraine Lunch, Inc.	Boston	Boston	Sept. 29, 1933	Discharged

Using Decomposed Eggs in the Manufacture of Food Pvoducts

Apollo Cake Specialties, Inc.	Charlestown	Charlestown	Dec. 8, 1932	Conviction
Paramount Baking Corp.	Roxbury	Roxbury	Dec. 19, 1932	Conviction
Peterkofsky, Inc.	Brighton	Brighton	Dec. 2, 1932	Conviction
Puritan Cake Co., Inc.	Cambridge	Cambridge	Dec. 7, 1932	Conviction
Rousokis, James S.	Cambridge	Cambridge	Dec. 7, 1932	Conviction

False and Misleading Advertising

EGGS

(Representing eggs which were not fresh as fresh eggs)

Abbott, Samuel	Roxbury	Roxbury	Jan. 25, 1933	Conviction
Berkman, Samuel	Roxbury	Roxbury	July 18, 1933	Conviction[1]
Boukalis, Peter	Worcester	Worcester	June 23, 1933	Conviction
Britto, Mary	New Bedford	New Bedford	Nov. 2, 1933	Conviction
Burstine, Barney	Springfield	Springfield	Sept. 19, 1933	Conviction
Comman, Max	Cambridge	Cambridge	Dec. 20, 1932	Conviction
Dakin & Co., H. L.	Worcester	Worcester	Dec. 30, 1932	Conviction
Fall River Trading & Finance Corporation	New Bedford	New Bedford	Nov. 2, 1933	Discharged
Grand Union Company	Pittsfield	Pittsfield	July 27, 1933	Conviction
Kariofiles, Peter	Springfield	Springfield	Dec. 28, 1932	Conviction
Katz, Harry	Roxbury	Roxbury	Dec. 2, 1932	Conviction
Kronick, Henry	North Adams	North Adams	Dec. 30, 1932	Conviction
Miller, Harry	Worcester	Worcester	Oct. 31, 1933	Conviction
Richton, Samuel	North Adams	North Adams	Nov. 28, 1933	Conviction
Sheridan, Thomas F.	Watertown	Waltham	Jan. 23, 1933	Conviction
United Cooperative Society of Fitchburg	Fitchburg	Fitchburg	Oct. 9, 1933	Discharged
Van Dyk Company, James	Springfield	Springfield	Dec. 14, 1932	Conviction
Widlansky, Isaac	Springfield	Springfield	Dec. 14, 1932	Conviction
Winer Company, M.	Haverhill	Haverhill	Feb. 1, 1933	Discharged
Winer Company, M.	Worcester	Worcester	Oct. 31, 1933	Conviction
Zolta, John	Springfield	Springfield	Sept. 19, 1933	Conviction

[1] Appealed; found Not Guilty in Superior Court.

MAPLE SYRUP

(False advertising of maple syrup)

Lagadinos, Nicholas	Worcester	Worcester	Dec. 13, 1932	Conviction

For Violation of Sanitary Food Law

Three Millers Company	Boston	Boston	Sept. 6, 1933	Conviction

Fov Violation of Bakery Laws

Dauten, Ludwig	Newton	Newton	Mar. 10, 1933	Conviction
Post's Taste-T-Foods, Inc.	Newton	West Newton	Mar. 10, 1933	Conviction
Rabinowitz, Charles	Pittsfield	Pittsfield	June 14, 1933	Conviction

For Violation of Soft Drink Laws

Kollman, Leo	Pittsfield	Pittsfield	June 14, 1933	Conviction

For Sale of Drugs Not Conforming to the Requirements of the U. S. Pharmacopoeia

Cottonseed Oil

Ivy Pharmacy, Inc.	Roxbury	Roxbury	May 12, 1933	Conviction
Ivy Pharmacy, Inc.	Roxbury	Roxbury	May 12, 1933	Conviction

For Violation of the Laws Relative to Cold Storage

Selling Cold Storage Eggs without Marking the Container

Armour & Co.	Boston	Boston	Feb. 7, 1933	Conviction
Avenzino Co., Inc., Paul	Cambridge	Cambridge	Jan. 17, 1933	Conviction
Bonerba, Frank	Beverly	Salem	Feb. 4, 1933	Conviction[1]
Bucci, Charles	Beverly	Salem	Feb. 4, 1933	Conviction
Burnstin, Bernard	Springfield	Springfield	Jan. 12, 1933	Conviction
Calebrese, Nicholas	Medford	Malden	Jan. 12, 1933	Conviction
Chicione, J. Henry	Springfield	Springfield	Jan. 5, 1933	Conviction
Cohen, Barney	Brighton	Brighton	Jan. 13, 1933	Conviction[1]
Contas Bros., Inc., J. S.	Waltham	Waltham	Jan. 23, 1933	Conviction
Corfine, Morris	Revere	Chelsea	Nov. 27, 1933	Conviction
Cudahy Packing Co.	South Boston	Roxbury	Dec. 30. 1932	Conviction
Deskin, Sarah	Revere	Chelsea	Dec. 6, 1932	Discharged
Di Pinto, Morris	Worcester	Worcester	Dec. 13, 1932	Conviction
Fine, Samuel	Revere	Chelsea	Dec. 6, 1932	Conviction
Govoni, Thomas	Springfield	Springfield	Jan. 12, 1933	Conviction
Hoffman, Hyman	Roxbury	Roxbury	Jan. 6, 1933	Conviction[1]
Ingemi, Stephen	Salem	Salem	Jan. 4, 1933	Conviction[1]
Kagin, Mary	Holyoke	Holyoke	Jan. 4, 1933	Conviction
Kumko, Stefan	Holyoke	Holyoke	Jan. 4, 1933	Conviction
Lamagna, Michael	Cambridge	Cambridge	Jan. 17, 1933	Discharged
Longo, Gerard	Medford	Malden	Jan. 12, 1933	Conviction
Murray, Michael L.	Taunton	Taunton	Feb. 7, 1933	Conviction
Raftery, Leo	Lee	Lee	Oct. 17, 1933	Conviction
Risman, Charles	Revere	Chelsea	Nov. 27, 1933	Conviction
Rizzo, Angelo	Everett	Malden	Jan. 5, 1933	Conviction
Silverman, Isaac	Revere	Chelsea	Dec. 6, 1932	Conviction
Swift & Co.	Springfield	Springfield	Jan. 19, 1933	Conviction

For Violation of the Laws Relative to Slaughtering

Slaughtering or Authorziing Slaughtering in the Absence of Inspector

Ferdenades, Jose	Norton	Attleboro	Dec. 28, 1932	Conviction
Sarro, Ralph	Mansfield	Attleboro	Dec. 15, 1932	Conviction

As Inspector of Slaughtering Used Stamp Illegally

Phillips, George C.	Norton	Attleboro	Dec. 15, 1932	Conviction

[1] Appealed.

For Violation of the Mattress Laws

Libow, Benjamin	Springfield	Springfield	Oct. 26, 1933	Conviction
Milstone, Morris	Lawrence	Lawrence	Nov. 15, 1933	Conviction
Milstone, Samuel	Lawrence	Lawrence	Nov. 15, 1933	Conviction
Orenstein, Philip	Springfield	Springfield	Oct. 26, 1933	Conviction
Pellett, Lewis	Holyoke	Holyoke	Nov. 24, 1933	Conviction
Weisman, Joseph	Haverhill	Haverhill	Nov. 13, 1933	Conviction

Table 2—*Summary of Milk Statistics*

Number above standard	4,497
Number below standard	628
Total samples	5.125
Number having more than 15% solids	27
" " between 14% and 15% solids	167
" " " 13% and 14% solids	1,175
" " " 12% and 13% solids	3,128
" " " 11% and 12% solids	570
" " " 10% and 11% solids	43
" " " 9% and 10% solids	14
" " less than 8% solids	1
Number of samples of skimmed milk sold as such	11
Number of samples showing removal of part of the cream	64
Number of samples showing added water	20

50% of samples with solids between 12.23% and 12.95%.
70% of samples with solids between 12.06% and 13.33%.
80% of samples with solids between 11.89% and 13.56%.

TABLE 3. — *Average Composition of Milk Samples*

	TOTAL SAMPLES COLLECTED				SAMPLES FOUND NOT ADULTERATED			
	Number of Samples	Solids	Fat	Solids not Fat	Number of Samples	Solids	Fat	Solids not Fat
		%	%	%		%	%	%
December	72	12.66	3.89	8.79	71	12.66	3.89	8.97
January	368	12.72	3.90	8.82	358	12.75	3.92	8.83
February	307	12.86	3.99	8.87	306	12.86	3.99	8.87
March	460	12.84	3.97	8.87	457	12.86	3.98	8.88
April	432	12.64	3.89	8.75	418	12.70	3.91	8.79
May	760	12.66	3.92	8.74	748	12.67	3.93	8.74
June	589	12.78	4.00	8.78	587	12.78	4.00	8.78
July	437	12.36	3.73	8.63	412	12.48	3.85	8.63
August	513	12.39	3.80	8.59	495	12.43	3.83	8.60
September	264	12.59	3.92	8.67	263	12.60	3.93	8.67
October	344	12.85	4.01	8.84	342	12.85	4.01	8.84
November	579	12.81	4.01	8.80	572	12.82	4.03	8.79
Totals	5,125	12.62	3.90	8.72	5,030	12.71	3.95	8.76

TABLE 4. — *Summary of Bacteriological Examinations of Milk*

CERTIFIED AND PASTEURIZED MILK

Total samples		81
Samples with count below 100	60	
Samples with count below 500	76	
Samples with count above 500	5	
Lowest count	less than 10	
Highest count	1,900	
Geometric mean	36	

CERTIFIED MILK

Total samples		97
Samples with count below 10,000	93	
Samples with count above 10,000	4	
Lowest count	less than 100	
Highest count	580,000	
Geometric mean	2,096	

GRADE A MILK

Total samples		222
Samples with count below 10,000	161	
Samples with count below 25,000	194	
Samples with count above 25,000	28	
Lowest count	less than 100	
Highest count	300,000	
Geometric mean	4,372	

PASTEURIZED MILK

Total samples		907
Samples with count below 25,000	642	
Samples with count below 50,000	741	
Samples with count above 50,000	166	
Lowest count	less than 100	
Highest count	2,000,000	
Geometric mean	12,034	

GRADE A MASSACHUSETTS MILK

Total samples		17
Samples with count below 50,000	15	
Samples with count below 100,000	16	
Samples with count above 100,000	1	
Lowest count	2,500	
Highest count	240,000	
Geometric mean	14,655	

RAW MILK SOLD AS SUCH

Total samples		337
Samples with count below 50,000	251	
Samples with count below 300,000	320	
Samples with count above 300,000	17	
Lowest count	200	
Highest count	1,500,000	
Geometric mean	23,625	

RAW MILK FOR GRADE A PURPOSES

Total samples		190
Samples with count below 100,000	144	
Samples with count below 250,000	169	
Samples with count above 250,000	21	
Lowest count	1,000	
Highest count	2,600,000	
Geometric mean	28,234	

RAW MILK TO BE PASTEURIZED

Total samples		1,831
Samples with count below 100,000	885	
Samples with count below 250,000	1,239	
Samples with count below 500,000	1,480	
Samples with count below 750,000	1,581	
Samples with count above 750,000	250	
Lowest count	1,000	
Highest count	8,300,000	
Geometric mean	64,334	

SUMMARY

Total samples		3,682
Samples complying with requirements	3,190	
Samples not complying with requirements	492	

TABLE 5. — *Summary of Analyses of Food Samples*

CHARACTER OF SAMPLE	NOT DECLARED ADULTERATED OR MISBRANDED	ADULTERATED OR MISBRANDED	TOTAL
Alimentary pastes	2	1	3
Bakery products	3	2	5
Beer	45	–	45
Butter	61	7	68
Cheese	1	–	1
Chocolate milk	–	1	1
Confectionery	20	–	20
Cream	31	1	32
Dried fruits	2	4	6
Eggs	318	99	417
Flavoring extracts:			
Lemon	1	–	1
Vanilla	91	18	109
Honey	2	–	2
Ice cream	13	1	14
Food colors	2	–	2
Mayonnaise	1	–	1
Meat preserving salts	6	–	6
Maple syrup	5	4	9
Marshmallow	5	8	13
Meat products:			
Beef suet	3	3	6
Ham	1	–	1
Hamburg steak	308	192	500
Head cheese	2	1	3
Liver	50	20	70
Pork chops	1	1	2
Pork kidneys	2	3	5
Sausages	1,126	111	1,237
Stew meat	2	1	3
Miscellaneous foods	5	1	6
Oleomargarine	2	–	2
Olives	1	3	4
Olive oil	6	2	8
Rice	1	–	1
Salad oil	–	3	3
Scallops	1	–	1
Spices	12	–	12
Vinegar	47	11	58
Totals	2,179	498	2,677

TABLE 6. — *Summary of Analyses of Drug Samples*

CHARACTER OF SAMPLE	NOT DECLARED ADULTERATED OR MISBRANDED	ADULTERATED OR MISBRANDED	TOTAL
Argyrol solution	2	–	2
Aromatic spirit of ammonia	3	–	3
Aspirin tablets	1	–	1
Calomel	1	–	1
Camphorated oil	27	3	30
Cottonseed oil	–	2	2
Magnesium citrate	1	–	1
Mercuric chloride	1	–	1
Olive oil	10	–	10
Prescriptions	–	2	2
Proprietary drug	1	–	1
Sodium phosphate	11	–	11
Spirit of camphor	30	–	30
Spirit of nitrous ether	21	–	21
Tincture of iodine	34	1	35
Totals	143	8	151

Summary of Tables 7, 8, 9

Requests for extension of time granted		185
Eggs	25	
Poultry	19	
Meat and meat products	35	
Fish	106	
Requests for extension of time not granted		2
Meat	1	
Fish	1	
Articles ordered removed from storage (no requests made)		60
Eggs	4	
Poultry	8	
Meat and meat products	25	
Game	2	
Fish	21	

TABLE 7. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1932, to December 1, 1933*

(Reason for such extension being that goods were in proper condition for further storage.)

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Eggs, Mixed	8,850	June 25, 1932	[1]Oct. 1, 1933	Stone Co., Charles H.
Eggs, Mixed	615	May 21, 1932	July 1, 1933	Stone Co., Charles H.
Eggs, Sugared Mixed	9,603	Mar. 6, 1932	[1]Dec. 6, 1933	Swift & Co.
Egg Whites	2,850	June 20, 1932	Aug. 1, 1933	Borden Sales Co., Inc.
Egg Whites	18,270	June 7, 1932	Sept. 1, 1933	Borden Sales Co., Inc.
Egg Whites	23,460	May 9, 1932	Sept. 9, 1933	Brockelman Bros., Inc.
Egg Whites	29,850	May 10, 1932	Sept. 9, 1933	Brockelman Bros., Inc.
Egg Whites	20,850	June 14, 1932	Nov. 17, 1933	Brown, M.
Egg Whites	1,333	Apr. 1, 1932	June 1, 1933	Genery Stevens Co.
Egg Whites	1,110	June 11, 1932	Aug. 1, 1933	Stone Co., Charles H.
Egg Whites	480	Mar. 1, 1932	June 1, 1933	Stone Co., Charles H.
Egg Whites	3,150	June 25, 1932	Sept. 1, 1933	Stone Co., Charles H.
Egg Whites	7,500	May 17, 1932	Nov. 1, 1933	Swift & Co.
Egg Whites	24,000	Mar. 1, 1931	[1]June 1, 1933	Swift & Co.
Eggs, Whole	360	June 4, 1932	Sept. 4, 1933	Standard Brands, Inc.
Eggs, Whole	1,320	July 28, 1932	Oct. 28, 1933	Standard Brands, Inc.
Eggs, Whole	6,360	June 11, 1932	Aug. 1, 1933	Stone Co., Charles H.
Eggs, Whole	2,130	June 24, 1932	[1]Dec. 20, 1933	Swift & Co.
Egg Yolks	270	June 4, 1932	Sept. 4, 1933	Standard Brands, Inc.
Egg Yolks	17,400	July 1, 1932	Nov. 3, 1933	Standard Brands, Inc.
Egg Yolks	420	May 26, 1932	July 1, 1933	Stone Co., Charles H.
Egg Yolks	2,040	Mar. 22, 1932	May 1, 1933	Stone Co., Charles H.
Egg Yolks	480	Mar. 6, 1932	June 6, 1933	Swift & Co.
Egg Yolks	14,348	May 20, 1932	[1]Dec. 20, 1933	Swift & Co.
Egg Yolks, Sugared	1,012	[2]Unknown	Mar. 23, 1933	Stone Co., Charles H.
Broilers	808	Sept. 1, 1932	Jan. 1, 1934	Frosted Foods Sales Corp.
Broilers	7,464	July 29, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Broilers	7,170	Aug. 29, 1932	Jan. 1, 1934	Frosted Foods Sales Corp.
Broilers	2,425	Sept. 23, 1932	[1]May 1, 1934	Frosted Foods Sales Corp.
Broilers	4,414	Sept. 10, 1932	Jan. 1, 1934	Frosted Foods Sales Corp.
Broilers	4,447	Oct. 3, 1932	Apr. 16, 1934	Frosted Foods Sales Corp.
Broilers	3,613	Oct. 3, 1932	Apr. 16, 1934	Frosted Foods Sales Corp
Chickens	550	Dec. 9, 1931	Jan. 31, 1933	Bartlett, Varney Co.
Chickens	1,963	Jan. 27, 1932	Mar. 31, 1933	Bartlett, Varney Co.
Chickens	1,420	Jan. 22, 1932	Apr. 22, 1933	Berman & Co., Inc.
Chickens	13,309	Nov. 11, 1932	May 8, 1934	Frosted Foods Sales Corp.
Chickens, Roasting	6,555	Sept. 10, 1932	Feb. 14, 1934	Frosted Foods Sales Corp.
Chickens, Roasting	6,246	Oct. 25, 1932	Mar. 25, 1934	Frosted Foods Sales Corp.
Fowl	8,939	Nov. 29, 1932	Apr. 1, 1934	Frosted Foods Sales Corp.
Fryers	2,480	Sept. 23, 1932	[1]May 1, 1934	Frosted Foods Sales Corp.
Fryers	9,805	Sept. 9, 1932	[1]May 1, 1934	Frosted Foods Sales Corp.
Fryers	3,571	Sept. 4, 1932	[1]May 1, 1934	Frosted Foods Sales Corp.
Turkeys	2,438	Nov. 8, 1932	May 8, 1934	Frosted Foods Sales Corp.
Turkeys	19,608	Nov. 22, 1932	Apr. 1, 1934	Frosted Foods Sales Corp.
Beef	1,859	Mar. 25, 1932	July 10, 1933	Davenport, William A.
Beef	642	Nov. 7, 1932	Feb. 7, 1934	Frosted Foods Sales Corp.
Beef	268	Oct. 6, 1932	Apr. 6, 1934	Long, William D.
Cow Meat	950	Nov. 1, 1932	Dec. 1, 1933	New England Provision Co.
Cow Meat	1,178	Nov. 3, 1932	Dec. 3, 1933	New England Provision Co.
Cow Meat	7,621	Nov. 8, 1932	Jan. 31, 1934	New England Provision Co.
Cow Meat	1,589	Nov. 17, 1932	Dec. 17, 1933	New England Provision Co.
Sirloin Roasts	1,401	May 3, 1932	Aug. 3, 1933	Batchelder, Snyder, Dorr & Doe Co.
Sirloin Roasts	359	Jan. 2, 1932	Apr. 2, 1933	Frosted Foods Sales Corp.
Sirloin Roasts	34	Jan. 2, 1932	Apr. 2, 1933	Frosted Foods Sales Corp.
Sirloin Roasts	125	Jan. 2, 1932	Apr. 2, 1933	Frosted Foods Sales Corp.
Sirloin Roasts	77	Jan. 2, 1932	Apr. 2, 1933	Frosted Foods Sales Corp.
Sirloin Roasts	484	Jan. 2, 1932	Apr. 2, 1933	Frosted Foods Sales Corp.
Lamb Chops	1,000	Apr. 22, 1932	July 22, 1933	Frosted Foods Sales Corp.
Lamb Legs	945	Jan. 12, 1932	Apr. 12, 1933	Frosted Foods Sales Corp.
Lamb Legs	2,770	Jan. 12, 1932	Apr. 12, 1933	Frosted Foods Sales Corp.
Lamb Legs	7,287	Jan. 18, 1932	Apr. 12, 1933	Frosted Foods Sales Corp.
Lamb, Stewing	1,142	Jan. 8, 1932	[1]June 28, 1933	Frosted Foods Sales Corp.
Lamb, Stewing	1,354	Jan. 8, 1932	[1]June 28, 1933	Frosted Foods Sales Corp.
Lamb, Stewing	6	Jan. 8, 1932	[1]June 28, 1933	Frosted Foods Sales Corp.
Pork Bellies	29,413	Dec. 30, 1931	Apr. 1, 1933	Chamberlain & Co.
Pork Loins	2,600	Feb. 6, 1932	Apr. 6, 1933	Boepple Co., George
Pork Loins	2,900	Dec. 23, 1931	Mar. 1, 1933	Boston Beef Co.
Pork Loins	2,365	Dec. 17, 1931	Feb. 17, 1933	Chicago Dressed Beef Co.
Pork Loins	1,740	July 27, 1932	Oct. 26, 1933	Dubuque Packing Co.
Pork Loins	1,260	July 27, 1932	Oct. 26, 1933	Dubuque Packing Co.
Pork Loins	1,260	July 27, 1932	Oct. 26, 1933	Dubuque Packing Co.
Pork Loins	540	July 27, 1932	Oct. 26, 1933	Dubuque Packing Co.
Pork Loins	2,100	Aug. 11, 1932	Nov. 10, 1933	Dubuque Packing Co.
Pork Loins	3,381	Aug. 15, 1932	Dec. 1, 1933	Learnard Co., S. S.
Pork Loins	3,400	Jan. 18, 1932	Apr. 18, 1933	Sears Co., Alfred
Pork Loin Roasts	1,426	Dec. 17, 1931	Mar. 17, 1933	Frosted Foods Sales Corp.
Pork Loin Roasts	9,304	Dec. 17, 1931	Mar. 17, 1933	Frosted Foods Sales Corp.
Pork Loin Roasts	706	Jan. 11, 1932	Apr. 12, 1933	Frosted Foods Sales Corp.
Sausage Meat	5,524	Nov. 7, 1932	May 8, 1934	Frosted Foods Sales Corp.
Butterfish	413	July 1, 1932	Nov. 1, 1933	Consolidated Weir Co.
Cod Fillets	610	May 13, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Cod Fillets	1,150	July 13, 1932	Jan. 4, 1934	Frosted Foods Sales Corp.
Cod Fillets	1,205	July 18, 1932	Jan. 4, 1934	Frosted Foods Sales Corp.

Table 7. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1931, to December 1, 1933* — Continued

Article	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Cod Fillets	657	Aug. 4, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Cusk Fillets	1,722	May 24, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Haddock Fillets	7,830	Dec. 17, 1931	Feb. 17, 1933	Bay State Fishing Co.
Haddock Fillets	2,610	Dec. 18, 1931	Feb. 17, 1933	Bay State Fishing Co.
Haddock Fillets	324	Feb. 8, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Haddock Fillets	450	June 4, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Hake Fillets	797	June 3, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Halibut	4,078	Aug. 15, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Halibut	13,538	Sept. 10, 1932	Feb. 14, 1934	Frosted Foods Sales Corp.
Halibut	1,996	Aug. 10, 1932	Nov. 10, 1933	O'Hara Bros. Co., Inc.
Herring	4,550	July 15, 1932	Jan. 15, 1934	Collins-Lee Co.
Lobster Meat	1,035	June 20, 1932	Aug. 20, 1933	Batchelder, Snyder, Dorr & Doe Co.
Lobster Meat	1,269	May 21, 1932	Nov. 26, 1933	Frosted Foods Sales Corp.
Lobster Meat	2,260	May 21, 1932	Nov. 26, 1933	Frosted Foods Sales Corp.
Lobster Meat	4,881	May 26, 1932	Nov. 26, 1933	Frosted Foods Sales Corp.
Lobster Meat	5,259	June 2, 1932	Dec. 5, 1933	Frosted Foods Sales Corp.
Lobster Meat	645	June 9, 1932	Dec. 5, 1933	Frosted Foods Sales Corp.
Mackerel	6,600	May 9, 1932	[1]Jan. 9, 1934	Atlantic & Pacific Fish Co.
Mackerel	44,623	May 10, 1932	[1]May 10, 1934	Atlantic & Pacific Fish Co.
Mackerel	14,600	Oct. 3, 1932	Feb. 28, 1934	Atlantic & Pacific Fish Co.
Mackerel	1,000	Oct. 28, 1932	Feb. 28, 1934	Atlantic & Pacific Fish Co.
Mackerel[3]	2,000	Apr. 28, 1932	Aug. 1, 1933	Burns McKeon Co.
Mackerel[3]	2,200	Apr. 28, 1932	Aug. 1, 1933	Burns McKeon Co.
Mackerel[3]	14,340	June 16, 1932	Sept. 1, 1933	Burns McKeon Co.
Mackerel	60,000	May 10, 1932	[1]Mar. 10, 1934	Cape Ann Cold Storage Co.
Mackerel	1,500	May 7, 1932	July 7, 1933	Fitts Bros., Inc.
Mackerel	300	Aug. 9, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Mackerel	400	Aug. 11, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Mackerel	14,000	May 26, 1932	Sept. 1, 1933	Gloucester Fresh Fish Co.
Mackerel	3,223	June 15, 1932	Dec. 15, 1933	Lewiston Sanitary Market
Mackerel	2,862	June 16, 1932	Dec. 15, 1933	Lewiston Sanitary Market
Mackerel	2,500	June 6, 1932	Jan. 1, 1934	Provincetown Cold Storage Co.
Mackerel Fillets	598	Oct. 6, 1932	Apr. 6, 1934	Davis Fish Co., Frank E.
Mackerel, Large	4,500	May 10, 1932	Dec. 31, 1933	Arnold & Winsor Co.
Mackerel, Large	2,800	Aug. 15, 1932	Dec. 31, 1933	Arnold & Winsor Co.
Mackerel, Large	34,800	June 15, 1932	[1]Feb. 15, 1934	Atlantic & Pacific Fish Co.
Mackerel, Large	3,000	Aug. 12, 1932	Feb. 12, 1934	Atlantic & Pacific Fish Co.
Mackerel, Large	3,500	Aug. 23, 1932	Feb. 23, 1934	Atlantic & Pacific Fish Co.
Mackerel, Large	160,000	June 1, 1932	[1]Feb. 18, 1934	Gorton-Pew Fisheries Co., Ltd.
Mackerel, Large and Med.	5,500	June 16, 1932	Sept. 16, 1933	Gloucester Fresh Fish Co.
Mackerel, Large and Med.	1,540	May 10, 1932	Oct. 10, 1932	Hoare, William J.
Mackerel, Small	6,200	June 21, 1932	Dec. 21, 1933	Atlantic & Pacific Fish Co.
Mackerel, Tinker	33,000	Aug. 1, 1932	Feb. 1, 1934	Atlantic & Pacific Fish Co.
Mackerel, Tinker	7,422	Aug. 8, 1932	Feb. 8, 1934	Atlantic & Pacific Fish Co.
Mackerel, Tinker	27,730	Sept. 26, 1932	Mar. 26, 1934	Atlantic & Pacific Fish Co.
Mackerel, Tinker	1,160	Aug. 2, 1932	Jan. 2, 1934	General Seafoods Corp.
Mackerel, Tinker	8,100	Aug. 2, 1932	Jan. 2, 1934	General Seafoods Corp.
Mackerel, Tinker	13,805	Aug. 2, 1932	Jan. 2, 1934	General Seafoods Corp.
Mackerel, Tinker	19,241	Aug. 2, 1932	Jan. 2, 1934	General Seafoods Corp
Mackerel, Tinker	3,700	Sept. 26, 1932	Mar. 31, 1934	Golden Fish Co.
Menhaden	260	Oct. 2, 1932	Feb. 1, 1934	Church, Vernon
Menhaden	600	Oct. 4, 1932	Feb. 1, 1934	Thomas, Henry E.
Pollock, Sliced	1,500	Jan. 2, 1932	Mar. 1, 1933	Whitman, Ward & Lee Co.
Pollock, Fillets	300	Feb. 26, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Pollock, Fillets	1,282	June 7, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Salmon, Boiling	3,461	July 4, 1932	[1]Jan. 1, 1934	Frosted Foods Sales Corp.
Salmon, Boiling	1,667	July 28, 1932	[1]Feb. 1, 1934	Frosted Foods Sales Corp.
Salmon Steaks	1,420	May 28, 1932	Dec. 5, 1933	Frosted Foods Sales Corp.
Salmon Steaks	3,075	June 14, 1932	Dec. 14, 1933	Frosted Foods Sales Corp.
Salmon Steaks	1,081	July 11, 1932	Oct. 1, 1933	Frosted Foods Sales Corp.
Scrod Fillets	684	May 26, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Scrod Fillets	3,850	July 18, 1932	Jan. 4, 1934	Frosted Foods Sales Corp.
Scrod Fillets	6,158	July 21, 1932	Jan. 4, 1934	Frosted Foods Sales Corp.
Scrod Fillets	3,403	July 27, 1932	Jan. 4, 1934	Frosted Foods Sales Corp.
Scrod Fillets	2,517	Aug. 2, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Scrod Fillets	3,593	Aug. 6, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Sole, Fillet of	95	May 26, 1932	Dec. 23, 1933	Davis Fish Co., Frank E.
Squid	11,709	June 30, 1932	Feb. 1, 1934	Atlantic Coast Fisheries Co.
Squid	7,110	July 14, 1932	Feb. 1, 1934	Atlantic Coast Fisheries Co.
Squid	8,050	May 19, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	2,750	May 21, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,600	May 23, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,600	May 24, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,000	May 26, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,100	May 27, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,750	May 31, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,600	June 1, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.

TABLE 7. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1931, to December 1, 1933* — Concluded

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Squid	600	June 2, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	400	June 3, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	2,050	June 7, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	2,140	June 7, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	600	June 9, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	1,450	June 9, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid	610	June 13, 1932	Nov. 1, 1933	Quincy Market C. S. & Warehouse Co.
Squid, Bone	86,060	June 1, 1932	Feb. 1, 1934	Consolidated Weir Co.
Squid, Bone	11,984	June 6, 1932	Jan. 1, 1934	Provincetown Cold Storage Co.
Squid, Bone	86,000	May 15, 1932	Feb. 1, 1934	Stage Harbor Freezer Co.
Squid, Bone	125,612	May 15, 1932	Feb. 1, 1934	Stage Harbor Freezer Co
Squid, Bone	11,136	May 6, 1932	Dec. 31, 1933	Tribuna Magri Co.
Squid, Bone	5,800	May 6, 1932	Dec. 31, 1933	Tribuna Magri Co.
Squid, Bone	13,568	May 19, 1932	Dec. 31, 1933	Tribuna Magri Co.
Squid, Bone	17,648	May 19, 1932	Dec. 31, 1933	Tribuna Magri Co.
Squid, Bone	3,600	May 28, 1932	Dec. 31, 1933	Tribuna Magri Co.
Swordfish	3,032	Aug. 15, 1932	[1]Feb. 1, 1934	Frosted Foods Sales Corp.
Swordfish	2,117	Aug. 15, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Swordfish	1,468	Aug. 17, 1932	[1]Feb. 1, 1934	Frosted Foods Sales Corp.
Swordfish	1,639	Aug. 23, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Swordfish	4,437	Aug. 23, 1932	[1]Feb. 1, 1934	Frosted Foods Sales Corp.
Swordfish	3,339	Sept. 8, 1932	[1]Feb. 1, 1934	Frosted Foods Sales Corp.
Swordfish Steaks	4,376	Aug. 9, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Swordfish Steaks	3,102	Aug. 11, 1932	Dec. 1, 1933	Frosted Foods Sales Corp.
Swordfish Steaks	5,454	Aug. 12, 1932	[1]Feb. 1, 1934	Frosted Foods Sales Corp.

[1] The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

[2] Imported.

[3] Bait.

TABLE 8. — *Requests for Extension of Time Not Granted on Goods in Cold Storage from December 1, 1932, to December 1, 1933*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Mutton	540	July 26, 1932	Goodenough & Russell
Haddock Fillets	930	Sept. 14, 1932	Mills & Son, Walter

TABLE 9. — *Articles which had been in Cold Storage Longer than Twelve Months and on which no Requests for Extensions had been made, ordered removed, from December 1, 1932, to December 1, 1933*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Eggs, Mixed	6,090	Mar. 14, 1932	Brockelman Bros., Inc.
Egg Whites	1,260	[1]Feb. 6, 1933	Standard Brands, Inc.
Egg Yolks	120	[1]Feb. 6, 1933	Standard Brands, Inc.
Salt Yolks	510	June 23, 1932	Borden Sales Co., Inc.
Broilers	180	May 23, 1932	Hosmer Co., F. H.
Broilers	400	Aug. 11, 1931	Lydon Co., Martin A.
Chickens	704	Dec. 16, 1931	Bartlett, Varney Co.
Chickens	1,865	Dec. 19, 1931	Bartlett, Varney Co.
Chickens	96	Sept. 6, 1932	Buxbaum Co., S.
Chickens	1,500	May 23, 1932	Ganem, J.
Squab	7	Jan. 21, 1932	Woodbury, L. P.
Turkeys	236	Jan. 15, 1932	Birdsey, F. J.
Beef	12,790	Nov. 10, 1931	Brighton Dressed Meat Co.
Beef	2,125	Mar. 15, 1932	Brighton Dressed Meat Co.
Beef	406	Mar. 19, 1932	Brighton Dressed Meat Co.
Beef	621	Mar. 19, 1932	Brighton Dressed Meat Co.
Beef	461	Mar. 25, 1932	Brighton Dressed Meat Co.
Beef	194	Aug. 26, 1932	Hanley, John J.
Beef	600	Sept. 30, 1932	Ye Brass Rail.
Beef Livers	243	July 14, 1931	Davidson, J. J.
Beef Livers	251	Jan. 4, 1932	Derba, E. A.
Beef Loins	560	July 24, 1932	Ye Brass Rail
Beef Tongues	125	Dec. 5, 1931	Berry-Wales Co.
Beef Tongues	135	July 1, 1932	Brighton Dressed Meat Co.
Cow Meat	1,342	Mar. 11, 1932	Brighton Dressed Meat Co.
Veal	412	Mar. 11, 1932	Brighton Dressed Meat Co.
Veal	208	Mar. 12, 1932	Brighton Dressed Meat Co.
Veal	167	Mar. 18, 1932	Brighton Dressed Meat Co.
Veal	157	Mar. 24, 1932	Brighton Dressed Meat Co.
Veal	62	Mar. 24, 1932	Brighton Dressed Meat Co.
Veal	318	Mar 29, 1932	Brighton Dressed Meat Co.
Veal	89	Mar. 30, 1932	Brighton Dressed Meat Co.
Veal	159	Mar. 31, 1932	Brighton Dressed Meat Co.
Lamb	62	July 21, 1932	Abrams, M.

TABLE 9. — *Requests for Extension of Time Not Granted on Goods in Cold Storage from December 1, 1932, to December 1, 1933* — Concluded.

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Lamb Legs	270	Nov. 28, 1931	Berry-Wales Co.
Hogs	3,085	June 21, 1932	Boepple Co., George
Pork Loins	500	Nov. 25, 1931	Rosoff, T.
Deer	125	Nov. 21, 1932	Jefferson, R. A.
Moose	275	Nov. 21, 1932	Jefferson, R. A.
Catfish, Skinned	275	June 6, 1932	O'Donnell Co., The
Fillets	180	Apr. 2, 1932	Gilbert Bros.
Fillets, Skinned	1,290	June 1, 1932	O'Hara Bros. Fillet Co.
Fillets, Skinned	1,155	June 2, 1932	O'Hara Bros. Fillet Co.
Fillets, Skinned	150	June 16, 1932	O'Hara Bros. Fillet Co.
Fillets, Skinned	225	June 25, 1932	O'Hara Bros. Fillet Co.
Fillets, Skinned	775	June 23, 1932	O'Hara Bros. Fillet Co.
Haddock Fillets	60	June 3, 1932	O'Hara Bros. Fillet Co.
Lemon Sole Fillets	90	June 4, 1932	O'Hara & Co., F. J.
Lobster Meat Stock	600	June 25, 1932	Smith & Son, Jay C.
Mackerel	470	May 28, 1932	Dietters Market
Pollock, Sliced	170	Dec. 30, 1931	O'Donnell Co., The
Scallops	240	Nov. 24, 1931	Barsanti Sea Grill
Scallops	136	Dec. 24, 1931	O'Donnell Co., The
Shrimp	250	Nov. 19, 1931	Mantia Co., S.
Shrimp	500	Nov. 20, 1931	Mantia Co., S.
Shrimp	1,000	Nov. 21, 1931	Mantia Co., S.
Shrimp	600	Nov. 23, 1931	Mantia Co., S.
Shrimp	450	Dec. 31, 1931	Mantia Co., S.
Smelts	410	Jan. 2, 1932	Pier Fish Co.
Squid	300	May 12, 1932	Talman, W. H.

[1] Received frozen and undated. No original storage date supplied.

TABLE 10. — *Articles Other than Fish Placed in Cold Storage from December 1, 1932, to December 1, 1933*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December	267,497	389,940	341,100	49,014	1,872,162	182,370	880,577	*	290,447	433,041	1,685,597	67,771	999,961
January	301,518	97,290	196,223	26,831	541,391	155,836	876,791	*	342,768	288,916	1,439,525	130,069	1,058,653
February	310,818	212,280	413,480	40,579	158,359	94,878	350,139	*	259,403	188,532	1,047,981	115,809	1,531,802
March	266,164	1,241,610	695,736	22,049	242,619	124,042	327,209	*	136,919	309,583	700,422	159,052	891,373
April	303,113	3,194,040	1,137,400	61,729	352,445	90,101	180,107	*	208,133	381,224	1,104,158	143,811	1,173,486
May	1,597,435	2,998,530	1,469,442	97,872	586,534	349,167	398,360	*	580,650	355,003	2,383,968	73,246	1,808,113
June	5,366,571	1,211,190	1,967,151	30,624	552,229	578,431	258,355	303,074	219,473	411,139	1,830,976	68,443	1,452,191
July	4,695,928	908,160	1,093,368	86,707	200,530	769,374	162,992	233,579	186,602	299,806	1,833,784	69,593	1,386,108
August	2,681,973	595,140	462,832	173,586	113,457	489,084	87,939	284,017	63,103	272,496	1,153,707	94,353	833,136
September	901,973	284,730	445,800	522,767	89,999	97,938	52,009	160,850	109,627	262,578	505,112	45,137	1,176,102
October	507,892	338,730	324,090	350,414	220,658	124,252	33,326	31,178	71,658	307,022	217,273	82,192	1,017,304
November	618,379	340,200	417,878	487,987	1,060,385	314,361	413,887	22,551	79,701	626,925	739,769	162,921	1,456,355

*Included in Miscellaneous Poultry.

TABLE 11. — *Articles Other than Fish on Hand in Cold Storage on the First Day of the Month, from January 1, 1933, through December 1, 1933*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January	1,432,800	187,080	1,251,034	353,143	3,736,924	372,174	1,914,450	*	1,274,443	915,756	2,935,753	173,005	554,373
February	669,818	39,600	899,866	292,062	3,653,103	371,962	2,456,903	*	1,042,058	881,497	3,780,789	114,500	686,777
March	413,250	121,470	803,653	261,372	2,986,626	319,040	2,171,165	*	808,865	649,173	3,867,105	150,577	1,021,797
April	294,935	1,245,900	958,391	191,958	2,265,489	246,620	2,044,836	*	336,971	700,081	3,330,057	190,424	734,908
May	371,722	4,300,440	1,427,786	155,879	1,711,541	248,650	1,392,705	*	209,054	820,266	3,160,019	186,010	1,101,606
June	1,709,959	7,148,760	2,083,140	143,778	1,299,195	402,470	1,281,269	*	531,984	867,443	4,297,192	192,974	1,472,917
July	6,601,772	7,961,970	3,286,539	111,788	1,196,487	877,493	1,221,683	422,070	501,316	1,064,185	5,209,109	188,125	2,193,157
August	10,560,377	8,049,120	3,688,334	144,480	853,839	1,468,128	1,060,092	649,932	491,442	955,468	5,771,787	180,053	2,382,333
September	12,025,573	7,152,330	3,316,993	287,005	638,489	1,669,031	627,976	918,932	403,232	809,446	5,101,508	209,712	2,232,629
October	11,242,715	5,489,820	3,069,900	762,968	562,113	1,368,793	402,301	1,069,177	408,860	842,327	3,021,221	218,617	2,166,166
November	8,873,990	3,378,900	2,627,816	1,038,196	731,328	1,325,043	178,641	1,039,575	360,533	861,582	1,526,757	262,216	1,786,686
December	5,708,703	1,450,710	2,382,929	1,427,465	1,696,672	1,460,790	389,542	913,950	374,419	1,182,030	1,283,432	375,116	1,811,942

*Included in Miscellaneous Poultry.

TABLE 12. — *Fish Placed in Cold Storage from December 15, 1932, to December 15, 1933*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	399	4,263	2,788	1,990	196,251	15,040	215,171	142,411	10,950	21,848	64,942	771	–	61,361	–	100	625,813	96,128
February	1,795	2,504	7,088	–	316,853	25,500	372,524	270,888	29,770	15,113	134,578	13,487	16	404,646	–	–	203,245	200.507
March	856	3,665	738	8,524	271,804	12,765	762,506	4,912	38,385	9,997	49,429	8,874	8	144,242	29,350	3,249	387,690	46,749
April	933	4,607	16,435	–	588,225	40,361	1,801,265	30,526	18,640	61,462	20,411	16,611	–	20,814	25,507	–	27,947	95,042
May	40	2,328	40,123	–	576,014	96,284	2,055,874	13,963	293,555	131,185	7,918	1,876	2,389	425	57,630	–	4,943	139,804
June	76	18,885	40,726	11,470	262,223	62,275	1,745,930	24,410	244,654	1,681,990	8,018	2,053	6,029	1,396	267,030	1,355	1,952,571	281,069
July	1,112	28,984	21,550	6,310	684,381	43,280	1,134,526	26,334	78,420	907,392	6,149	13,742	10,070	135	215,097	150	3,625,976	231,401
August	19,173	24,345	2,359	12,420	979,536	53,255	2,287,739	25,864	340,395	2,295,833	762	15,165	89,185	6,215	78,676	2,110	1,233,409	482,909
September	2,396	31,150	120	3,330	475,785	10,412	1,927,977	32,018	611,165	2,291,014	3,056	4,074	81,900	705	50,430	85	243,405	760,772
October	15,468	15,562	795	2,250	383,350	26,770	2,292,182	86,522	281,325	917,108	14,826	6,793	235	1,623	3,729	1,250	111,334	425,931
November	2,259	21,234	995	1,200	705,717	15,140	1,240,340	123,941	263,390	379,968	19,698	11,776	2,558	9,286	45,856	–	124,265	383,679
December	1,302	1,666	1,000	1,746	1,001,084	28,485	731,073	117,208	247,885	123,858	25,250	17,189	94	60,862	59,559	–	603,306	421,331

TABLE 13. — *Fish on Hand in Cold Storage on the Fifteenth Day of the Month, from January 15, 1933, through December 15, 1933*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	8,253	81,964	10,439	5,072	591,576	62,924	1,076,581	204,690	407,778	6,321,595	71,824	31,720	3,080	51,637	1,349,539	317	2,366,377	954,534
February	7,447	45,143	14,924	463	332,873	44,396	565,474	242,391	305,638	4,267,735	82,845	27,139	1,602	400,532	1,149,573	137	1,542,659	780,084
March	5,238	20,526	4,705	4,133	89,726	18,127	253,984	113,550	248,656	2,571,496	29,928	15,789	743	346,198	861,848	1,799	879,374	522,929
April	2,618	7,242	12,950	–	370,864	36,660	1,236,637	77,545	99,887	1,490,995	12,657	17,451	513	266,321	555,885	124	220,115	402,277
May	906	1,421	52,663	–	681,519	106,235	1,847,320	63,740	176,151	1,058,123	5,620	8,638	2,767	240,101	484,576	124	4,946	379,320
June	642	19,911	61,519	11,470	711,166	74,368	2,390,334	73,780	129,717	2,413,183	10,590	5,183	6,773	229,125	727,102	1,479	1,917,246	577,954
July	1,452	46,140	82,794	15,885	1,172,905	103,497	2,632,150	79,765	106,085	3,113,954	2,384	12,021	16,684	225,686	850,478	1,604	5,264,146	698,879
August	20,356	68,920	74,454	25,085	1,824,214	149,375	3,787,239	94,771	215,174	5,106,509	2,225	21,567	105,428	228,730	838,482	3,350	5,980,304	1,107,424
September	17,989	99,412	55,197	21,755	1,616,274	144,701	4,079,477	119,532	681,629	6,758,778	4,549	18,637	186,801	224,884	671,771	3,145	5,695,719	1,684,025
October	31,080	114,264	49,064	20,080	1,146,282	113,625	5,131,760	170,354	782,423	6,904,795	14,730	19,518	145,534	213,722	510,780	2,398	5,364,112	1,765,240
November	30,337	129,664	37,107	12,206	1,342,608	92,836	4,725,808	253,010	851,966	6,075,860	29,269	26,641	82,049	163,133	362,707	1,578	4,902,407	1,612,121
December	23,825	102,590	28,664	9,497	1,884,364	99,817	4,167,288	244,033	739,280	5,024,045	22,064	31,820	45,071	118,525	266,830	1,097	4,575,221	1,594,656

TABLE 14. — *Summary of Slaughtering Inspections from December 1, 1932, through November 30, 1933*

Total number of carcasses inspected	181,619	Total number of carcasses condemned	2,256
Cattle	28,769	Cattle	498
Calves	85,093	Calves	1,308
Hogs	59,308	Hogs	434
Sheep	8,449	Sheep	16

REASON FOR CONDEMNATION	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	–	1,227	–	–	1,227
Tuberculosis	454	5	81	12	552
Cholera	–	–	227	–	227
Injured or bruised	5	28	9	2	44
Pneumonia	9	–	29	–	38
Unhealed vaccine lesions	–	–	31	–	31
Died otherwise than by slaughter	1	15	7	1	24
Septicaemia	5	3	14	1	23
Emaciated	5	6	11	–	22
Poisoned	–	1	7	–	8
Milk fever	5	1	1	–	7
Abscesses	5	–	2	–	7
Scours	–	7	–	–	7
Navel ill	–	6	–	–	6
Tumor or ulcer	1	–	3	–	4
Urticaria	–	–	3	–	3
Enteritis	–	1	2	–	3
Premature	–	3	–	–	3
Acute inflammation	1	–	2	–	3
Measles	1	–	1	–	2
Jaundice	–	1	1	–	2
Peritonitis	2	–	–	–	2
Edema	–	1	–	–	1
Ascites	–	–	1	–	1
Pericarditis	1	–	–	–	1
Mastitis	1	–	–	–	1
Overcome by heat	–	1	–	–	1
Slaughtered illegally	–	1	–	–	1
Pleuritis	1	–	–	–	1
Abortion	–	–	1	–	1
Hoof rot	1	–	–	–	1
Swollen gland	–	1	–	–	1
Sexual odor	–	–	1	–	1
Totals	498	1,308	434	16	2,256

TABLE 15. — *Confiscations*

IN WAREHOUSES

Chickens	400 lbs.	Decomposed	Pigs' Feet	230 lbs.	Decomposed
Chickens and Fowl	260 "	"	Pork Kidneys	350 "	"
Chicken Legs (Cooked)	39 "	Unclean	Eels, Sand	135 "	Dried Out
Chicken Paste (Cooked)	176 "	Decomposed	Halibut	625 "	Decomposed
Chicken Paste (Cooked)	364 "	"	Herring, Sardine	500 "	Dried Out
Chicken Paste (Cooked)	495 "	"	Mackerel	1,300 "	Decomposed
Roosters	138 "	Tainted	Mackerel	3,230 "	"
"Spegatte" (Cooked)	70 "	Decomposed	Mackerel	4,501 "	"
Beef Livers	45 "	"	Smelts	200 "	Dried Out
Beef Sweetbreads	60 "	"	Snappers, Red	250 "	" "

IN STORES, MARKETS, ETC.

Chicken	18 lbs.	Decomposed	Pork Sausage	½ lb.	Decomposed
Fowl	35½ "	"	Miscellaneous Meats:—		
Beef	200 "	"	Bologna	¾ lb.	"
Beef Liver	3 "	"	Bologna	6 lbs.	"
Hamburg Steak	2 "	"	Frankforts	16 "	"
Lamb's Liver	6 "	"	Liver	3 "	"
Lamb, Stew	8 "	"	Liver	4 "	"
Ham Ends	6 "	"			

IN SLAUGHTERHOUSE

Beef	500 lbs.	Peritonitis
Total pounds confiscated	14,176¾	

Table 16. — *Summary of Inspections of Bakeries Made by the Division*

Number of such bakeries inspected	371
Number of defects found as follows:—	
Floors not properly constructed or maintained	28
Walls not properly constructed or maintained	17
Ceilings not properly constructed or maintained	18
Storage facilities not properly constructed or maintained	10
Apparatus not properly constructed or maintained	29
Stock not properly protected	22
Products not properly protected	36
Flies abundant	4
Flour storage unsatisfactory	4
Tobacco used in bakery	11
Absence of garbage can	9
Miscellaneous defects	19
Total defects	207

Table 17. — *Liquor Report*

Character of Samples

Cities and Towns	Beer	Cider	Wine	Distilled spirits	Extracts	Alcohol	Miscellaneous	Total
Boston	199	–	23	651	8	255	26	1,162
Cambridge	47	–	13	108	–	25	5	198
Everett	8	–	6	9	–	5	–	28
Fitchburg	29	–	2	12	–	4	–	47
Lowell	27	–	2	28	–	7	5	69
Lynn	30	–	6	39	–	8	1	84
Malden	6	–	1	18	–	11	–	36
Newburyport	15	–	8	7	–	5	4	39
Quincy	25	–	8	52	–	20	–	105
Salem	11	–	2	38	–	45	1	97
Somerville	14	–	1	18	–	3	–	36
Springfield	30	–	8	79	–	10	3	130
Waltham	23	–	2	14	–	13	1	53
Dep't. Pub. Safety	82	–	16	174	–	23	–	295
*Miscellaneous	175	3	32	247	–	78	10	545
Total	721	3	130	1,494	8	512	56	2,924

* 83 towns submitting less than twenty-five samples each.

REPORT OF THE DIVISION OF SANITARY ENGINEERING

Arthur D. Weston, *Director and Chief Engineer*

Oversight and Care of Inland Waters

During the year 1933 the Engineering Division investigated 497 applications requiring the advice of this Department, of which 336 related to water supply, 42 to matters of sewerage and sewage disposal, 6 to pollution of streams, 6 to ice supplies, and 107 to bathing, shellfish and other miscellaneous matters. This number is about the same as that received during the year 1932 but considerably less than was received during the year 1931, the latter year having the largest number of applications received by this Department in many years. Practically all of these applications required field investigations by the engineers, analyses of samples of water, ice, sewage and industrial waste by the Division of Water and Sewage Laboratories, and bacterial examinations by the Lawrence Experiment Station. In addition many of the applications required field examinations by chemists of the Water and Sewage Laboratories and the Lawrence Experiment Station. The Department also made many examinations of private water supplies in order to ascertain whether the recommendations of the Department made at previous dates have been carried out.

A new public water supply was introduced in the town of Sturbridge in the year 1933. Consequently the number of cities and towns having public water supplies is now 239.*

The average rainfall in the State for the year ending December 31, 1933, as recorded at seven long-term stations located in different parts of the State was 50.22 inches or 5.69 inches above the normal. There was a deficiency in rainfall during the months of January, May, June, July, November and December, and an excess of rainfall in the other six months of the year. The total deficiency for the three months of May, June and July was the greatest for this period since the similar period in 1913. The rainfall for the month of September was 10.61 inches, or an excess for that one month of 7.08 inches. The average rainfall throughout the State in September was the highest for any month in the past 44 years. For the climatological year ending September 30, 1933, there was an excess of rainfall of 10.89 inches.

Metropolitan Water Supply

On March 10, 1933, the water of the Wachusett Reservoir reached the elevation of the spillway and by the use of flashboards the water in this reservoir was maintained at an elevation as high as or higher than the spillway until June 20. This is the highest elevation for the water in this reservoir for any year since the year 1929.

During the past year no water was diverted through the new diversion works and tunnel constructed for the purpose of discharging the flood waters of the Ware River at Coldbrook into the Wachusett Reservoir. On October 16, 1933, the tunnel from Coldbrook to the Swift River had been holed through. This tunnel will probably be lined and ready for the diversion of water prior to December 1934.

During the year the Department of Labor and Industries granted permission for continuing the work of completing the tunnel from the Ware River at Coldbrook to the Swift River under the emergency clause of Chapter 321 of the Acts of 1927. Prior to making this decision, the Department of Labor and Industires was advised by the Department of Public Health that in its opinion a sufficient emergency existed to warrant the continuation of this work under the emergency clause of said Chapter 321. The Legislature enacted during the year 1932 Chapter 262 which permits the Metropolitan District Water Supply Commission to construct works for the diversion of sewage and other polluting matter from within the watershed of the Ware and Quinapoxet rivers. Contracts for this work were let by the Metropolitan District Water Supply Commission in July 1933, and it is the understanding of this Department that these works will be available for the diversion of sewage into the sewerage system of the city of Worcester during the summer of 1934.

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*Includes several smaller towns supplied only in part by water companies, industrial plants, or from other towns.

Sanitary Protection of Public Water Supplies

In the year 1933 rules and regulations were adopted by the Department in accordance with Section 160 of Chapter 111 of the General Laws for the purpose of preventing the pollution and securing the sanitary protection of the waters used as sources of water supply by the Palmer Fire District No. 1 in Graves Brook, the Lenox Water Company in reservoirs on Lenox Mountain, and the Cheshire Water Company in Kitchen Brook Reservoir.

The cities, towns, fire and water districts, and water companies, for which rules and regulations have been adopted are as follows:

Abington and Rockland	1927
Adams (Fire District)	1921
Amherst (Water Company)	1931
Andover	1908
Ashburnham	1922
Ashfield (Water Company)	1923
Attleboro	1926
Braintree	1913,1926
Brockton	1905
Cambridge	1899
Cheshire (Water Company)	1933
Chester	1914
Chicopee	1906
Cohasset (Water Company)	1923
Colrain (Fire District)	1932
Concord	1910
Dalton (Fire District)	1919
Danvers and Middleton	1920
Deerfield (So. Deerfield Water Supply District)	1932
Easthampton	1904
Egremont (So. Egremont Water Company)	1932
Fall River	1907
Falmouth	1930
Fitchburg	1903, 1907, 1918
Gardner	1910
Gloucester	1930
Great Barrington (Housatonic Water Works Company)	1929
Greenfield	1904
Haverhill	1921
Hingham and Hull (Hingham Water Company)	1912
Holden	1914
Holyoke	1908, 1918
Hudson	1929
Lakeville (State Sanatorium)	1926
Lee (Berkshire Water Company)	1919
Leicester (Cherry Valley and Rochdale Water District)	1914
Lenox (Water Company)	1933
Leominster	1919, 1927
Lincoln and Concord	1903
Lynn	1907
Marlborough	1901
Maynard	1907
Medfield (State Hospital)	1922
Metropolitan Water District	1925
Milford (Water Company)	1924
Montague (Turners Falls Fire District)	1908
New Bedford	1932
Newburyport	1921
Norfolk (State Hospital)	1926
Northampton	1904
North Andover	1912
Northborough	1905
Norwood	1901
Palmer (Fire District No. 1)	1933
Peabody	1922
Pittsfield	1903, 1909
Plymouth	1908
Randolph and Holbrook	1926
Rockport	1902
Russell	1910
Rutland	1914
Salem and Beverly	1901
Scituate	1927
Southbridge (Southbridge Water Supply Company)	1931
Springfield	1904, 1910
Stockbridge (Water Company)	1910
Taunton	1932
Wakefield	1904
Westborough	1929
Westfield	1922
West Springfield	1907
Weymouth	1903
Williamsburg	1914
Winchester	1909
Worcester	1926

Examination of Public Water Supplies

Examinations of the public water supplies of the State have been somewhat more extensive during the past year than in recent years, this practice being deemed necessary because of the possibility of insanitary conditions on the watersheds resulting from the employment of men for the relief of unemployment. The regular samples were collected for chemical analysis and microscopical examination, and a large number of samples were collected for bacterial examination in connection with these supplies.

The following are the average results of chemical analyses of samples of water collected from the sources of public water supply during the year 1933:

Analyses of the Water of Public Water Supplies
Averages of Chemical Analyses of Surface-Water Sources for the Year 1933

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorine	Hardness
					Albuminoid			
				Free	Total	Sus-pended		
Metropolitan Water District . . .	Wachusett Reservoir, upper end	22	36.8	.017	.091	.023	2.5	14
	Wachusett Reservoir, lower end	13	36.2	.012	.093	.027	2.6	15
	Sudbury Reservoir . . .	17	40.2	.014	.114	.030	3.2	18
	Framingham Reservoir No. 3 .	19	42.6	.015	.115	.033	3.5	19
	Hopkinton Reservoir . . .	50	41.7	.010	.140	.032	3.1	14
	Ashland Reservoir . . .	51	46.2	.010	.146	.030	4.3	14
	Framingham Reservoir No. 2 .	74	61.4	.035	.182	.038	6.5	18
	Lake Cochituate . . .	20	81.3	.087	.136	.033	8.8	32
	Chestnut Hill Reservoir . .	17	48.7	.073	.097	.026	4.5	21
	Weston Reservoir . . .	15	41.2	.010	.091	.024	3.3	17
	Spot Pond	9	40.7	.010	.110	.033	3.9	18
	Tap in State House . . .	15	41.5	.010	.095	.026	4.0	19
	Tap in Revere	8	40.0	.003	.074	.022	3.8	20
	Tap in Quincy	11	43.7	.006	.057	.012	4.0	20
Abington . . .	Big Sandy Pond	5	38.2	.016	.106	.029	8.2	9
Acushnet (Fire and Water District) .	New Bedford Water Supply .							
Adams (Fire District)	Dry Brook	13	64.7	.007	.058	.016	1.1	52
	Bassett Brook	0	34.7	.009	.031	.011	1.1	25
Agawam . . .	Springfield Water Supply .							
Amherst (Water Co.)	Atkins Pond	19	33.5	.215	.329	.154	1.6	10
	Amethyst Brook-intake reservoir	28	39.4	.011	.109	.048	1.7	11
Andover . . .	Haggett's Pond	14	46.5	.012	.134	.023	5.4	19
Arlington . . .	Metropolitan Water Supply .							
Ashburnham . .	Upper Naukeag Lake . .	4	23.7	.025	.047	.016	1.8	8
Ashfield (Water Co.) .	Highland Spring Reservoir .	26	55.0	.004	.074	.027	1.3	33
Athol	Buckman Brook Reservoir (Newton Reservoir) . .	22	32.2	.013	.108	.032	1.7	11
	Thousand Acre Meadow Brook	156	63.2	.022	.223	.041	1.7	16
	Inlet, Summer Street filters .	15	32.3	.011	.092	.036	1.5	11
	Outlet, Summer Street filters .	12	31.8	.014	.125	.054	1.5	11
	Phillipston Reservoir . . .	43	42.2	.060	.194	.050	2.6	13
	Outlet of Mechanical Filter .	39	38.7	.029	.147	–	1.9	13
Barre	Reservoir	15	34.8	.013	.101	.025	1.9	14
Belmont . . .	Metropolitan Water Supply .							
BEVERLY . . .	Joint supply with Salem . .							
Blackstone . . .	Tap (supply from Woonsocket, R. I.)	30	41.0	.004	.094	.015	3.7	23
Blandford . . .	Freeland Brook	4	32.7	.002	.017	.003	2.0	16
BOSTON . . .	Metropolitan Water Supply .							
Braintree . . .	Joint supply with Randolph .							
BROCKTON . . .	Silver Lake	8	35.4	.007	.090	.031	6.3	8
Brookfield . . .	Cooley Hill Reservoir . .	12	32.2	.020	.119	.036	1.9	10
CAMBRIDGE . . .	Fresh Pond	10	97.0	.044	.127	.031	8.2	47
	Filter effluent	1	96.5	.021	.047	–	7.5	47
	Stony Brook Reservoir . .	41	73.5	.030	.167	.045	6.6	30
	Upper Hobbs Brook Reservoir	41	63.6	.032	.184	.042	5.5	27
	Lower Hobbs Brook Reservoir	22	61.9	.030	.168	.034	5.6	26
CHELSEA . . .	Metropolitan Water Supply .							
Cheshire (Water Co.)	Kitchen Brook Reservoir . .	0	49.4	.008	.019	.008	1.5	35
Chester . . .	Austin Brook Reservoir . .	10	40.2	.012	.091	.028	1.4	18
	Horn Pond	18	37.3	.016	.179	.083	1.2	16
CHICOPEE . . .	Cooley Brook Reservoir, filtered	2	61.4	.025	.020	–	2.7	27
	Morton Brook	4	56.3	.006	.030	.016	3.4	21
Clinton . . .	Lower Lynde's Reservoir . .	13	35.1	.025	.107	.040	2.4	14
	Heywood Pond	16	34.4	.016	.120	.043	2.2	13
	Spring Basin	12	42.2	.030	.093	–	2.3	15
Colrain (Griswoldville)	McClellan Brook Reservoir .	3	66.0	.002	.014	.004	1.2	46
Colrain (Fire District No. 1) . . .	Mountain Brook Reservoir .	9	75.0	.004	.038	.009	1.1	68
Concord . . .	Nagog Pond	3	31.0	.016	.103	.024	4.5	11
Dalton (Fire District)	Egypt Brook Reservoir . .	26	31.3	.005	.075	.019	1.1	11
	Cady Brook	28	50.5	.017	.086	.017	1.3	26
	Tap in town	26	43 5	.011	.081	.023	1.3	23
	Windsor Reservoir . . .	32	50.7	.044	.119	.033	1.3	31
Danvers . . .	Middleton Pond	51	45.2	.021	.161	.033	4.6	16
	Swan Pond	30	45.1	.018	.167	.033	4.5	20
Dartmouth . . .	New Bedford Water Supply .							
Deerfield (South Deerfield Water Supply District) . . .	Roaring Brook Reservoir . .	8	65.0	.001	.028	.009	1.4	41
East Bridgewater .	Brockton Water Supply . .							
East Longmeadow .	Springfield Water Supply . .							
Egremont (South Egremont Water Co.) .	Goodale Brook Reservoir . .	4	45.2	.001	.014	.009	1.3	29
Erving (Millers Falls Water Supply Dist.)	Montague (Turners Falls Fire Dist.) Water Supply . .							

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorine	Hardness
				Free	Albuminoid			
					Total	Sus-pended		
EVERETT	Metropolitan Water Supply							
FALL RIVER	North Watuppa Lake	8	38.0	.015	.125	.036	5.7	12
Falmouth	Long Pond	3	34.9	.005	.070	.020	10.5	6
FITCHBURG	Ashby Reservoir	19	29.0	.058	.190	.068	2.0	9
	Scott Reservoir	7	29.0	.019	.157	.052	2.4	10
	Meetinghouse Pond	7	27.0	.016	.168	.053	2.3	11
	Wachusett Lake	7	30.7	.014	.099	.025	2.1	9
	Falulah Brook	14	27.8	.029	.112	.046	2.3	9
	Lovell Reservoir	16	27.5	.066	.143	.033	2.1	7
GARDNER	Crystal Lake	7	45.8	.013	.113	.021	3.6	23
GLOUCESTER	Haskell Reservoir	9	40.9	.005	.077	.027	8.4	9
	Dike's Brook Reservoir	31	41.6	.020	.115	.030	8.9	7
	Wallace Reservoir	54	52.6	.021	.160	.045	10.0	8
Great Barrington (Housatonic Water Works Co.)	Long Pond	4	76.8	.021	.167	.045	1.6	74
Great Barrington (Fire District)	East Mountain Reservoir	7	52.7	.021	.083	.037	1.4	39
Greenfield	Glen Brook Upper Reservoir	3	60.0	.010	.079	.039	1.8	37
	Glen Brook Lower Reservoir	3	55.2	.008	.052	.016	1.8	35
Groveland	Haverhill Water Supply							
Hadley (Water Supply District)	Hart's Brook Reservoir	10	45.5	.014	.065	.019	2.1	26
Hanson	Brockton Water Supply							
Hatfield	Running Gutter Brook Reservoir	8	78.5	.003	.023	.006	2.2	32
HAVERHILL	Millvale Reservoir	54	55.9	.020	.140	.035	4.3	23
	Johnson's Pond	14	56.9	.010	.132	.034	5.5	27
	Crystal Lake	14	37.9	.006	.117	.029	5.4	17
	Pentucket Lake	7	47.7	.017	.147	.037	4.8	23
	Kenoza Lake	14	50.6	.013	.122	.035	5.0	25
Hingham (Water Co.)	Accord Pond	19	38.6	.011	.117	.031	6.7	11
Hinsdale (Fire Dist.)	Reservoir	8	22.2	.003	.022	.010	1.2	8
Holbrook	Joint supply with Randolph							
Holden	Rutland Water Supply							
HOLYOKE	High Service Reservoir	11	36.3	.012	.123	.034	1.4	20
	Fomer Reservoir	24	35.6	.015	.136	.043	1.4	15
	Wright and Ashley ponds	11	49.9	.014	.104	.027	1.5	28
	White Reservoir	14	35.5	.011	.114	.036	1.4	16
	Whiting Street Reservoir	6	53.8	.015	.113	.026	1.8	30
Hopedale	Milford Water Supply							
Hudson	Gates Pond	10	35.3	.009	.101	.018	2.6	16
Hull	Hingham Water Supply							
Huntington (Fire District)	Cold Brook Reservoir	11	32.2	.002	.035	.013	1.4	13
Ipswich	Dow's Brook Reservoir	21	52.5	.022	.151	.043	7.5	21
	Bull Brook Reservoir	100	68.0	.021	.196	.036	7.4	26
Lancaster	Clinton Water Supply							
LAWRENCE	Merrimack River, filtered	38	53.5	.045	.106	–	6.1	15
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	4	43.0	.007	.049	.010	1.2	25
	Codding Brook Lower Reservoir	7	40.3	.007	.060	.029	1.1	18
	Basin Pond Brook	57	41.3	.005	.115	.026	1.1	17
Lenox (Water Co.)	Lower Root Reservoir	3	75.5	.006	.058	.021	1.1	63
	Woolsey Reservoir	4	67.6	.007	.043	.015	1.1	47
LEOMINSTER	Fall Brook Reservoir	8	25.3	.011	.082	.024	2.2	7
	Haynes Reservoir	9	23.7	.023	.098	.026	2.1	8
	Morse Reservoir	11	26.9	.012	.087	.024	2.0	6
	No-Town Reservoir	26	25.4	.020	.107	.023	1.7	6
Lexington	Metropolitan Water Supply							
Lincoln	Sandy Pond	5	33.3	.009	.109	.039	3.3	13
Longmeadow	Springfield Water Supply							
Ludlow	Springfield Water Supply							
LYNN	Breeds Pond	21	58.9	.031	.158	.030	7.9	26
	Birch Pond	18	60.3	.047	.204	.050	7.9	24
	Hawkes Pond	53	73.3	.046	.229	.047	7.8	33
	Walden Pond	37	65.6	.021	.168	.030	7.9	29
Lynnfield	Lynn Water Supply							
MALDEN	Metropolitan Water Supply							
Manchester	Gravel Pond	26	46.5	.017	.085	.027	9.8	15
MARLBOROUGH	Lake Williams	10	59.9	.019	.160	.038	6.7	26
	Millham Brook Reservoir	39	51.5	.040	.126	.031	4.3	19
Maynard	White Pond	3	29.9	.013	.116	.033	3.0	8
MEDFORD	Metropolitan Water Supply							
MELROSE	Metropolitan Water Supply							
Middleton	Joint supply with Danvers							
Milford (Water Co.)	Dug wells and Charles River, filtered	14	59.5	.008	.037	–	3.9	30
Milton	Metropolitan Water Supply							

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorine	Hardness
				Free	Albuminoid			
					Total	Suspended		
Montague (Turners Falls Fire District)	Lake Pleasant	4	27.2	.018	.084	.031	1.5	11
Monterey (Water Co.)	Reservoir	3	90.9	.001	.022	.009	1.2	81
Nahant	Metropolitan Water Supply							
NEW BEDFORD	Great Quittacas Pond	46	41.6	.012	.133	.026	5.5	10
	Little Quittacas Pond	26	40.3	.024	.146	.035	5.5	12
NEWBURYPORT	Dug wells and Artichoke River, filtered	12	66.7	.005	.061	–	7.4	28
NORTH ADAMS	Broad Brook	9	36.6	.014	.046	.012	1.0	19
	Notch Brook Reservoir	5	71.3	.006	.029	.014	1.2	58
	Mount Williams Reservoir	2	68.8	.004	.055	.024	1.2	60
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	19	45.7	.005	.062	.014	2.2	21
	Mountain Street Reservoir	8	43.1	.008	.063	.018	1.4	25
North Andover	Great Pond	12	51.9	.011	.130	.035	5.0	22
Northborough	Lower Reservoir (Cold Harbor Brook)	66	45.1	.027	.140	.027	2.8	14
North Brookfield	Doane Pond	28	39.2	.027	.216	.048	2.4	10
	North Pond	30	36.7	.053	.187	.054	2.3	12
Northfield (Water Co.)	Reservoir—Northfield	21	37.7	.003	.043	.010	1.4	14
Northfield (Northfield Schools, Inc.)	Reservoir—East Northfield	19	40.7	.006	.071	.019	1.8	21
Norwood	Buckmaster Pond, filtered	8	50.0	.017	.095	–	6.7	20
Orange	Coolidge Brook Reservoir	27	34.7	.008	.083	.025	1.7	10
Palmer (Fire District No. 1.)	Lower Reservoir (Graves Brook)	16	36.0	.013	.095	.033	2.0	12
PEABODY	Spring Pond	10	57.5	.027	.126	.043	7.8	21
	Suntaug Lake	38	63.5	.038	.170	.038	7.7	22
Pembroke	Brockton Water Supply							
PITTSFIELD	Sackett Reservoir	9	68.1	.010	.052	.020	1.3	60
	Hathaway Reservoir	6	87.5	.005	.034	.011	1.4	83
	Ashley Reservoir	11	75.7	.002	.040	.011	1.2	64
	Ashley Lake	10	53.9	.027	.057	.015	1.4	44
	Farnham Reservoir	34	36.6	.058	.172	.055	1.3	16
	Mill Brook	27	43.0	.056	.115	.042	1.2	20
Plainville	No. Attleborough Water Supply							
Plymouth	Little South Pond	0	27.6	.017	.113	.028	6.8	4
	Great South Pond	0	27.6	.009	.111	.029	6.8	3
QUINCY	Metropolitan Water Supply							
Randolph	Great Pond	36	54.6	.017	.146	.029	8.4	17
REVERE	Metropolitan Water Supply							
Rockland	Joint supply with Abington							
Rockport	Cape Pond	48	90.5	.019	.250	.092	25.1	19
Russell	Black Brook Reservoir	25	38.2	.003	.077	.023	2.0	16
Rutland	Muschopauge Lake	2	43.7	.019	.117	.018	4.0	21
SALEM	Wenham Lake	39	75.6	.056	.145	.035	9.6	29
	Longham Reservoir	92	74.1	.066	.242	.046	9.8	25
	Ipswich River at pumping station	73	138.3	.129	.234	.080	8.9	61
Saugus	Lynn Water Supply							
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	3	59.5	.003	.026	.011	1.5	36
SOMERVILLE	Metropolitan Water Supply							
Southborough	Sudbury Reservoir	19	38.1	.030	.098	.029	2.7	16
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	13	26.2	.015	.085	.024	2.1	8
	Hatchet Brook Reservoir No. 4	16	29.0	.029	.119	.036	2.2	8
So. Hadley (So. Hadley Falls Fire Dist. No. 1)	Buttery Brook Reservoir	9	50.4	.038	.082	.037	3.9	21
	Leaping Well Reservoir	3	32.0	.017	.087	.045	1.9	12
Southwick	Springfield Water Supply							
Spencer	Shaw Pond	8	27.8	.006	.103	.025	2.3	10
SPRINGFIELD	Cobble Mountain Reservoir	29	37.0	.029	.131	.032	1.3	14
	Westfield Little River, filtered	11	37.3	.002	.049	–	1.4	14
Stockbridge (Water Co.)	Lake Averic	7	66.9	.037	.102	.033	1.3	46
Stoneham	Metropolitan Water Supply							
Stoughton	Muddy Pond	13	40.5	.003	.059	.022	3.7	11
Sunderland	Saw Mill Brook Reservoir	1	66.0	.000	.012	–	1.9	40
Swampscott	Metropolitan Water Supply							
TAUNTON	Assawompsett Pond	30	37.1	.019	.129	.032	5.5	9
	Elder's Pond	7	34.4	.010	.108	.024	5.4	9
Wakefield	Crystal Lake, filtered	5	74.0	.002	.057	–	9.4	34
Wareham (Onset Fire District)	Jonathan Pond	4	28.0	.008	.096	.030	6.3	5
Watertown	Metropolitan Water Supply							
West Bridgewater	Brockton Water Supply							
WESTFIELD	Montgomery Reservoir	34	26.1	.052	.116	.038	1.5	6
	Winchell Reservoir	6	30.5	.015	.055	.020	1.4	9
	New Granville Reservoir	10	30.8	.025	.074	.021	1.7	7
Westhampton (Water Co.)	Reservoir	7	40.7	.001	.031	–	1.8	20

Averages of Chemical Analyses of Surface-Water Sources, etc.—Concluded

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorine	Hardness
				Free	Albuminoid			
					Total	Sus-pended		
West Springfield	Bear Hole Brook Reservoir	4	72.4	.023	.063	.020	1.8	48
	Bear Hole Brook Reservoir, filtered	1	70.7	.003	.030	–	1.7	45
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	4	55.2	.002	.018	.006	1.5	35
Weymouth	Great Pond	40	39.0	.014	.098	.014	5.7	10
Whitman	Brockton Water Supply							
Wilbraham	Springfield Water Supply							
Williamsburg	Reservoir	13	47.7	.005	.077	.035	1.5	25
Williamstown (Water Co.)	Paul Brook	1	89.2	.009	.035	.014	1.1	69
	Rattlesnake Brook Reservoir	3	83.7	.004	.050	.031	1.1	78
Winchester	North Reservoir	6	45.6	.011	.094	.024	4.6	22
	Middle Reservoir	10	36.4	.021	.146	.047	4.4	18
	South Reservoir	7	38.9	.019	.096	.034	4.4	19
Winthrop	Metropolitan Water Supply							
WORCESTER	Pine Hill Reservoir	8	32.6	.041	.107	.030	2.4	14
	Upper Holden Reservoir	11	29.0	.009	.084	.020	2.2	11
	Lower Holden Reservoir	9	27.0	.007	.082	.023	2.2	12
	Leicester Reservoir	14	37.6	.021	.112	.033	2.4	15
	Bottomly Reservoir	24	42.4	.013	.153	.041	2.7	19
	Kent Reservoir	15	44.6	.023	.147	.043	2.6	18
	Mann Reservoir	15	40.9	.009	.140	.024	2.5	18
	Kendall Reservoir	8	33.9	.022	.111	.026	2.4	15
	Quinapoxet Pond	26	32.7	.017	.102	.023	2.3	13

Averages of Chemical Analyses of Ground-Water Sources for the Year 1933

[Parts per Million]

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Acton (West and South Water Supply District)	Tubular wells	0	95.6	.000	.012	7.0	1.480	.000	42	.08
Adams (Fire District)	Tubular wells	0	126.0	.000	.006	1.6	.300	.000	117	.08
Amesbury	Tubular wells	10	148.7	.079	.026	6.4	.020	.000	68	6.77
	Tubular wells, filtered	0	137.7	.001	.018	5.6	.020	.000	72	.12
Ashland	New tubular wells	0	63.5	.002	.020	4.6	.173	.000	25	.08
ATTLEBORO	Dug wells and filtered water, South Attleboro	1	54.4	.005	.020	4.8	.020	.000	24	.08
	Tubular wells, West Mansfield	3	46.0	.025	.008	4.1	.020	.002	20	1.57
Auburn (Water Co.)	Tubular wells	1	102.3	.001	.009	8.3	2.100	.000	51	.07
Avon	Dug and tubular wells	1	91.6	.002	.019	6.7	2.600	.000	36	.08
Ayer	Dug well	0	92.0	.002	.008	8.6	1.670	.000	37	.11
	Tubular wells	2	70.7	.005	.009	4.5	.031	.000	38	.35
Barnstable (Water Co.)	Tubular wells (old supply)	0	48.0	.007	.012	10.9	.020	.000	10	.14
Bedford	Dug well	1	45.7	.000	.013	3.7	.040	.000	14	.09
	Tubular wells	0	51.5	.000	.022	4.2	.250	.000	20	.36
Belchertown (Water District)	Tubular wells	0	67.5	.000	.006	4.1	.027	.000	32	.08
Billerica	Gravel-packed wells—Tap in pumping station	15	77.3	.063	.064	7.9	.063	.000	29	.27
Bourne (Monument Beach)	Tubular wells	0	56.0	.000	.009	11.1	.360	.000	14	.09
Bridgewater	Tubular wells	0	63.6	.002	.008	6.3	1.700	.000	19	.11
Brookline	Tubular wells and filter gallery, filtered	6	94.6	.002	.031	8.0	.244	.000	40	.08
Canton	Henry's Spring well	7	70.8	.002	.016	7.3	1.000	.000	25	.08
	Ward well	7	74.8	.007	.020	6.2	.410	.000	30	.09
	Springdale well	6	69.0	.006	.015	5.8	.433	.000	27	.08
Chatham (Water Co.)	Filter gallery near White Pond	0	51.5	.004	.065	18.8	.020	.000	8	.09
	Tubular wells	0	48.0	.000	.004	13.6	.020	.000	6	.06
Chelmsford (North Chelmsford Fire District)	Tubular wells	11	61.4	.123	.046	5.0	.554	.001	24	.33
Chelmsford (Water District)	Tubular wells	2	77.0	.006	.017	6.1	.612	.002	33	.21
Cohasset (Water Co.)	Tubular wells, Elms Meadow	6	142.5	.000	.048	20.1	1.825	.000	60	.09
	Dug well, filtered	15	87.2	.012	.069	12.3	.085	.000	30	.16
Cummington	Springs, tap	1	49.0	.005	.005	3.0	1.800	.000	25	.13
Dedham (Water Co.)	Dug and tubular wells	6	105.2	.008	.037	10.3	.850	.000	44	.11
Deerfield (Fire District)	Springs	0	48.7	.000	.006	2.7	.060	.000	27	.07
Douglas	Tubular wells	0	59.7	.000	.008	4.2	.700	.000	22	.06
Dracut (Water Supply District)	Tubular wells, Dracut	6	132.3	.013	.045	8.1	1.233	.000	63	.20
	Tubular wells, Collinsville	2	56.7	.001	.010	3.8	.070	.000	26	.12
Dudley	Tubular wells	0	39.0	.001	.013	3.5	.020	.000	15	.08
Dunstable	Dug and tubular wells	2	65.0	.001	.015	3.6	1.833	.000	27	.09
Duxbury (Fire and Water District)	Tubular wells	1	49.0	.001	.014	8.9	.050	.000	9	.07
East Brookfield	Dug well	0	33.3	.001	.010	2.3	.020	.000	11	.09
Easthampton	Tubular wells	1	65.7	.000	.010	2.1	.300	.000	42	.07
Easton (North Easton Village District)	Dug well	3	54.3	.002	.036	5.4	.472	.000	24	.08
Easton (Unionville Fire and Water Dist.)	North Easton Village District Water Supply									
Edgartown (Water Co.)	Dug and tubular wells	0	28.3	.000	.005	9.5	.020	.000	5	.06
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	31	80.0	.003	.053	9.9	.575	.000	30	.24
	Tubular wells near Mattapoisett River	0	65.0	.000	.009	9.6	.783	.000	27	.07

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorine	Nitrogen as —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Foxborough	Tubular wells	1	56.0	.001	.013	5.1	.700	.000	24	.10
Framingham	Tap in pumping station	13	68.7	.158	.089	8.7	–	–	30	.19
Franklin	Tubular wells	3	47.7	.000	.012	4.7	.027	.000	20	.29
Gill (Riverside Water Co.)	Spring	5	75.0	.000	.018	2.5	.750	.000	36	.17
Grafton (Water Co.)	Gravel-packed well at North Grafton	0	64.0	.000	.012	7.5	.273	.000	32	.11
	Dug wells at Grafton	2	115.5	.000	.017	12.8	2.875	.000	47	.09
Granville (Water Co.)	Well and springs	2	33.7	.001	.023	1.5	.020	.000	10	.11
Great Barrington (Fire District)	Dug well near Green River	1	102.0	.001	.008	1.6	.110	.000	85	.09
	Filter gallery near Green River	1	111.7	.002	.008	1.5	.090	.000	91	.10
Greenfield	Dug well near Green River	6	60.7	.000	.017	1.6	.020	.000	44	.23
Groton (Water Co.)	Dug well	1	68.7	.032	.015	2.9	.020	.000	39	.11
Groton (West Groton Water Supply District)	Tubular wells	2	50.0	.002	.006	2.6	.053	.001	29	.28
Hanover	Tubular wells	1	61.9	.002	.008	7.2	.039	.000	23	.12
Hardwick (Center)	Dug well	1	39.7	.000	.008	1.9	.020	.000	15	1.15
Hardwick (Gilbertville)	Dug and tubular wells	0	70.0	.000	.011	2.1	.020	.000	38	.34
Hardwick (Wheelwright)	Tubular wells	1	40.0	.001	.006	3.5	.467	.000	14	.36
Hingham (Water Co.)	Filter galleries	17	68.7	.006	.043	7.5	.111	.000	27	.14
Holliston (Water Co)	Large well	29	54.2	.034	.052	3.7	.040	.000	23	.97
Hopedale	Milford Water Supply									
Hopkinton	New tubular wells	0	60.0	.001	.006	4.6	.767	.000	29	.09
Hull	Hingham Water Supply									
Kingston	Tubular wells	1	46.0	.003	.006	7.4	.080	.000	14	.07
Leicester (Water Supply District)	Dug wells	2	63.3	.002	.012	3.6	.933	.000	31	.10
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	18	50.7	.035	.097	3.0	.020	.000	24	.15
Littleton	Tubular wells	0	41.3	.001	.007	2.4	.130	.000	21	.10
LOWELL	Boulevard wells, filtered	11	60.6	.001	.022	4.8	.385	.000	28	.26
Manchester	Dug and tubular wells	1	102.1	.003	.021	16.0	.953	.000	36	.13
Mansfield	Dug well	0	46.0	.000	.007	3.8	.090	.000	17	.11
Marblehead	Inlet of filter	13	181.8	.056	.024	21.6	.143	.000	91	2.03
	Dug and tubular wells, filtered	9	190.5	.002	.042	18.4	.085	.000	99	.13
Marion	Old tubular wells	0	46.7	.001	.009	7.6	.275	.000	20	.07
	New tubular wells	0	94.0	.000	.004	12.4	.600	.000	36	.18
Marshfield	Tubular wells	0	56.3	.000	.007	7.7	.020	.000	8	.11
Marshfield (Humarock Beach)	Tubular wells	1	93.0	.000	.006	24.1	.400	.001	24	.15
Mattapoisett	Tubular wells	1	58.2	.001	.006	7.6	.147	.000	22	.08
Medfield	Tubular wells, tap in town	9	68.5	.000	.012	3.6	.035	.000	29	.19
Medway	Tubular wells	1	91.0	.035	.014	10.4	.625	.000	37	.15
Merrimac	Tubular wells	0	89.0	.005	.011	6.6	.175	.000	36	.11
Methuen	Tubular wells at Pine Island	2	107.3	.042	.010	10.1	2.000	.000	54	.32
	Lone Tree Hill wells	0	78.2	.161	.038	6.7	.362	.004	37	.08
Middleborough	Dug well, filtered	6	71.2	.000	.012	7.1	.380	.000	28	.27
Millbury (Water Co.)	Dug well	3	49.0	.001	.020	3.1	.125	.000	24	.08
Millis	Dug wells	2	130.4	.000	.008	10.1	2.550	.000	59	.09
Monson	Old dug well	15	39.2	.000	.020	2.1	.020	.000	11	.10
	New dug well	0	32.5	.002	.015	2.1	.020	.000	10	.07
Montague (Montague Village)	Montague Village Springs	4	48.3	.001	.023	2.1	.020	.000	26	.14
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	2	58.0	.001	.007	18.3	.022	.000	17	.12
Nantucket (Siasconset)	Dug wells	4	66.0	.001	.009	17.8	.030	.009	20	.19
Natick	Dug well	0	118.0	.001	.010	11.6	.487	.000	60	.07

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Needham . . .	Dug well No. 1 .	5	96.8	.001	.025	8.2	1.867	.000	38	.08
	Dug well No. 2 .	0	93.3	.001	.018	7.7	1.333	.000	38	.08
	Tubular wells (Great Plain Avenue) . .	1	82.2	.003	.017	8.2	.930	.000	33	.10
NEWTON . . .	Tap in pumping station. (Treated water)	3	132.6	.006	.020	8.1	.144	.000	31	.13
	Dug well No. 1 .	1	79.8	.001	.013	7.0	.045	.000	36	.07
	Dug well No. 2 .	1	76.1	.001	.017	7.1	.091	.000	34	.06
North Attleborough	Dug wells . .	1	63.7	.000	.009	6.0	.305	.000	28	.31
Northbridge . .	Tubular wells (Meadow Pond)	0	50.0	.000	.007	4.1	.167	.000	20	.13
	Tubular wells (Cook Allen) .	0	28.0	.000	.028	2.3	.020	.000	10	.09
Norton . . .	Tubular wells .	3	48.3	.000	.009	3.5	.020	.000	18	.23
Norwood . . .	Tubular wells .	10	92.2	.002	.010	7.3	.681	.000	39	1.02
Oak Bluffs (Cottage City Water Co.) .	Springs . .	1	43.7	.017	.053	9.5	.083	.000	8	.09
Orange . . .	Crystal Spring .	4	38.3	.003	.022	2.5	–	–	14	.10
Oxford (Water Co.) .	Tubular wells .	0	56.7	.000	.005	3.6	.400	.000	25	.06
Palmer (Bondsville Water Co.) . .	Tubular wells .	3	57.3	.000	.006	3.1	.233	.000	26	.43
Pepperell . . .	Tubular wells .	1	35.7	.000	.005	1.7	.020	.000	16	.08
Provincetown . .	Tubular wells .	1	145.3	.003	.005	56.8	.020	.000	32	.16
Reading . . .	New tubular wells	5	62.6	.000	.006	5.9	.190	.000	33	.33
Rockport . . .	Tubular wells .	0	70.5	.000	.005	15.2	.285	.000	21	.08
Salisbury (Water Supply Co.) . . .	Old dug well .	7	97.3	.002	.007	6.2	.020	.000	50	.41
	New dug well .	10	95.6	.000	.005	6.8	.020	.000	55	.70
Scituate . . .	Webster Meadow wells . .	0	143.4	.001	.007	29.0	.761	.000	61	.15
	Bound Brook well	13	129.2	.001	.044	17.7	.720	.001	52	.11
Sharon . . .	Dug well . .	0	211.0	.000	.006	35.9	3.750	.001	92	.10
	Tubular wells .	0	64.2	.000	.008	6.6	.700	.000	29	.16
Sheffield (Water Co.)	Smith's Spring .	0	34.3	.001	.004	1.2	.020	.000	16	.09
	Clark's Spring .	8	48.3	.005	.039	1.7	.023	.000	22	.08
Shirley . . .	Dug wells . .	0	67.3	.001	.008	5.6	2.100	.000	23	.13
Shrewsbury . .	Tubular wells (South Street)	1	65.3	.005	.015	4.3	.667	.000	26	.16
	Tubular wells (Oak Street) .	0	55.7	.002	.007	4.0	.170	.000	22	.06
Somerset . . .	Tubular wells .	12	146.0	.001	.014	6.6	.060	.000	36	.61
South Hadley (Fire District No. 2) .	Dug wells . .	0	54.3	.001	.008	2.7	.300	.000	27	.09
Sturbridge . . .	Tubular wells .	1	60.5	.001	.004	4.2	.450	.000	24	.15
Sutton (Water Co.) .	Tubular wells .	0	96.7	.013	.029	5.3	.400	.050	50	.18
Tisbury . . .	Tashmoo Spring	0	43.7	.000	.007	10.3	.020	.000	7	.11
Uxbridge . . .	Tubular wells .	0	66.0	.001	.005	6.4	1.300	.003	30	.07
Walpole . . .	Tubular wells .	1	56.7	.000	.010	4.8	.500	.000	23	.06
WALTHAM . . .	Old dug well .	10	100.9	.037	.023	9.5	.045	.000	45	1.12
	New dug well .	2	79.4	.005	.019	7.1	.232	.000	38	.08
Ware	Dug and tubular wells . .	0	88.5	.003	.008	6.0	1.312	.000	36	.08
Wareham (Wareham Fire District) .	Tubular wells .	0	33.6	.000	.006	6.4	.020	.000	9	.07
Warren (Water District) . . .	Tubular wells .	1	40.7	.000	.005	2.9	.205	.000	13	.05
Warren (West Warren Water Co.) .	Dug wells . .	27	54.3	.001	.042	2.1	.040	.000	24	.37
Wayland . . .	Tubular wells .	0	96.2	.003	.009	6.4	.956	.000	45	.11
Webster . . .	Dug and tubular wells	1	49.0	.014	.008	3.7	.250	.000	25	.18
Wellesley . . .	Tubular wells at pumping station No. 1 . .	6	93.7	.002	.010	8.5	.450	.000	40	.31
	Dug well at pumping station No.2	0	89.2	.000	.005	7.3	.625	.000	38	.07
	Large tubular well at pumping station No. 3 .	1	86.0	.000	.004	6.1	.675	.000	37	.09
Westborough . .	Filter basin .	1	34.3	.019	.073	3.1	–	–	15	.14
West Brookfield .	Tubular wells .	0	48.7	.002	.008	2.9	.020	.000	15	.08
Westford (Water Co.)	Tubular wells (Westford) .	0	60.0	.000	.004	2.4	.020	.000	27	.10
Weston . . .	Tubular wells at Warren Avenue	1	108.7	.000	.011	8.0	1.975	.000	48	.13
	Tubular wells at Kendal Green	0	81.0	.000	.010	6.6	.725	.000	35	.09

Averages of Chemical Analyses of Ground-Water Sources, etc.—Concluded

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia: Free	Ammonia: Albuminoid	Chlorine	Nitrogen as — Nitrates	Nitrogen as — Nitrites	Hardness	Iron
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	3	100.2	.006	.015	1.4	.020	.000	69	.09
	Blake's Spring	0	157.0	.000	.004	0.9	.030	.000	123	.07
Westwood	Dedham Water Supply									
Williamstown (Water Co.)	Cold Spring	1	136.0	.000	.008	1.1	.250	.000	148	.11
	Sherman Spring	1	90.3	.002	.010	1.1	.030	.000	73	.08
Wilmington	Tubular wells	0	71.4	.001	.006	6.3	.900	.000	30	.07
Winchendon	Old dug well	28	40.8	.020	.039	2.2	.020	.000	16	1.73
	New dug well	36	41.2	.022	.050	2.0	.023	.000	16	.83
WOBURN	Gravel-packed well A	3	141.0	.031	.022	15.1	.283	.000	68	.06
	Gravel-packed well B	0	124.3	.054	.017	13.5	.107	.000	63	.09
	Gravel-packed well C	1	100.5	.000	.017	10.4	.190	.000	49	.09
	Gravel-packed well D	0	78.0	.005	.011	8.4	.085	.000	41	.07
Worthington	Springs	5	25.3	.001	.022	1.4	.020	.000	10	.16
Wrentham	Dug and tubular wells	0	59.7	.000	.005	4.5	1.500	.000	25	.09
Yarmouth	Tubular wells	1	45.7	.002	.005	13.6	.020	.000	9	.07

Consumption of Water

The consumption of water during the twelve months ending December 31, 1933, in the various cities and towns throughout the State was less than that for a similar period in the year 1932. This condition probably is due chiefly to the reduction in industrial activities and the excessive rainfall for those months of the year when water is used for irrigation.

The average daily water consumption in the various cities and towns where records are kept and supplied to this Department, the estimated population in these cities and towns, and the per capita water consumption, are shown in the following table:

Average Daily Consumption of Water in Various Cities and Towns in 1933

City or Town	Estimated Population	Gallons	Gallons per Inhabitant
Metropolitan Water District			
Arlington	42,785	2,121,000	50
Belmont	25,643	1,439,000	56
BOSTON	782,129	82,999,000	106
CHELSEA	45,816	3,340,000	73
EVERETT	52,235	4,306,000	82
Lexington	10,476	629,000	60
MALDEN	61,784	3,552,000	57
MEDFORD	66,966	3,222,000	48
MELROSE	24,973	1,512,000	61
Milton	18,598	884,000	48
Nahant	1,668	207,000	124
QUINCY	79,140	5,107,000	65
REVERE	37,130	2,055,000	55
SOMERVILLE	106,834	8,724,000	82
Stoneham	10,645	832,000	78
Swampscott	11,182	782,000	70
Watertown	40,580	2,187,000	54
Winthrop	17,268	1,178,000	68
Abington and Rockland	13,396	585,000	44
Acton	2,539	101,000	40
Acushnet	4,092	68,000	17
Agawam	7,578	289,000	38
Amesbury	12,301	574,000	47
Amherst	5,888	581,000	99
Andover	9,969	899,000	90
Ashland	2,397	195,000	81
Athol	11,322	631,000	56

City or Town	Estimated Population	Gallons	Gallons per Inhabitant
ATTLEBORO	22,457	1,134,000	50
Avon	2,446	124,000	51
Ayer	3,077	179,000	58
Barnstable	7,271	390,000	54
Bedford	3,256	147,000	45
Belchertown	3,280	26,000	8
BEVERLY	26,527	1,457,000	55
Billerica	6,460	249,000	39
Blandford	610	15,000	25
Braintree	17,224	870,000	50
Bridgewater	9,055	203,000	22
BROCKTON	63,797	3,118,000	49
Brookfield	1,352	38,000	28
Brookline	50,376	4,609,000	91
CAMBRIDGE	113,643	11,548,000	102
Canton	5,816	650,000	112
Chatham	2,045	75,000	37
Chelmsford	7,291	216,000	30
CHICOPEE	45,159	2,648,000	59
Clinton	12,817	784,000	61
Cohasset	3,185	297,000	93
Concord	7,729	591,000	76
Danvers and Middleton	15,391	1,211,000	79
Dartmouth	8,778	242,000	28
Dedham	15,867	1,403,000	88
Douglas	2,195	192,000	87
Dracut	7,219	175,000	24
Dudley	4,265	194,000	45
Duxbury	1,701	208,000	122

Average Daily Consumption of Water in Various Cities and Towns in 1933

CITY OR TOWN	Estimated Population	Gallons	Gallons per Inhabitant
East Bridgewater	3,623	133,000	37
East Brookfield	926	34,000	37
Easthampton	11,323	777,000	69
East Longmeadow	3,443	83,000	24
Easton	5,298	236,000	45
Edgartown	1,301	124,000	95
Fairhaven	11,025	390,000	35
FALL RIVER	115,274	5,985,000	52
Falmouth	4,898	789,000	161
FITCHBURG	40,692	4,019,000	99
Foxborough	5,595	542,000	97
Framingham	22,890	1,381,000	60
Franklin	7,028	541,000	77
GARDNER	19,800	835,000	42
GLOUCESTER	24,701	1,636,000	66
Grafton	7,064	214,000	30
Greenfield	15,652	1,429,000	91
Groton	2,438	205,000	84
Groveland	2,336	59,000	25
Hanover	2,839	117,000	41
Hanson and Pembroke	3,694	102,000	28
HAVERHILL	48,710	3,608,000	74
Holden	4,132	277,000	67
Holliston	2,895	105,000	36
HOLYOKE	56,537	6,988,000	124
Hopkinton	2,563	65,000	25
Hudson	8,672	393,000	45
Ipswich	5,599	246,000	44
Kingston	2,761	242,000	88
Lancaster	3,028	94,000	31
LAWRENCE	85,068	4,557,000	54
Lenox	2,742	300,000	109
Lincoln	1,605	266,000	166
Littleton	1,469	66,000	45
Longmeadow	5,099	262,000	51
LOWELL	100,234	5,706,000	57
Ludlow	8,920	303,000	34
LYNN	102,320	7,188,000	70
Lynnfield	1,751	26,000	15
Manchester	2,718	364,000	134
Mansfield	6,364	508,000	80
Marblehead	8,941	728,000	81
Marion	1,858	154,000	83
MARLBOROUGH	15,587	743,000	48
Marshfield	1,625	242,000	149
Mattapoisett	1,501	105,000	70
Maynard	7,156	289,000	40
Medfield	4,185	58,000	14
Medway	3,158	181,000	57
Merrimac	2,418	163,000	67
Methuen	21,348	1,107,000	52
Middleborough	8,608	287,000	33
Milford and Hopedale	17,714	841,000	47
Millbury	7,267	727,000	100
Millis	1,738	165,000	95
Montague and Erving	9,366	890,000	95
Nantucket	3,994	637,000	159
Natick	14,020	776,000	55
Needham	11,965	730,000	61
NEW BEDFORD	112,597	8,938,000	79
NEWBURYPORT	15,084	1,220,000	81
NEWTON	72,639	4,710,000	65
NORTH ADAMS	21,621	2,129,000	98
North Andover	7,035	434,000	62
North Attleborough	10,441	701,000	67
Northbridge	9,713	635,000	65
North Brookfield	3,013	315,000	105
Norton	2,737	133,000	49
Norwood	15,588	1,054,000	68
Oak Bluffs	1,344	125,000	93
Oxford	3,943	187,000	47
PEABODY	22,230	2,828,000	127
Pepperell	3,008	269,000	89
PITTSFIELD	51,357	5,156,000	100
Plainville	1,626	67,000	41
Plymouth	13,042	1,122,000	86
Provincetown	3,880	424,000	109
Randolph and Holbrook	10,499	586,000	56
Reading	10,411	471,000	45
Rockport	3,630	357,000	98
Rutland	2,566	209,000	81
SALEM	43,673	4,206,000	96
Salisbury	2,418	216,000	89
Saugus	15,874	845,000	53
Scituate	3,361	522,000	155
Sharon	3,491	292,000	84
Shelburne	1,548	84,000	54
Shirley	2,447	72,000	29
Shrewbury	7,564	269,000	36
Somerset	5,746	169,000	29
Southborough	2,234	69,000	31
Southbridge	14,264	764,000	54
South Hadley	6,870	408,000	59
Southwick	1,578	27,000	17
SPRINGFIELD	154,601	13,468,000	87
Stockbridge	1,762	201,000	114
Stoughton	8,413	547,000	65
TAUNTON	37,355	2,784,000	75
Tisbury	1,607	247,000	154
Uxbridge	6,353	222,000	35
Wakefield	16,742	708,000	42
Walpole	7,732	912,000	118
WALTHAM	41,948	2,178,000	52
Ware	7,385	299,000	40
Wareham	5,742	301,000	52
Warren	3,765	64,000	17
Wayland	3,286	305,000	93
Webster	12,992	662,000	51
Wellesley	12,873	898,000	70
West Bridgewater	3,257	173,000	53
West Brookfield	1,255	62,000	49
WESTFIELD	20,035	1,888,000	94
Westford	3,617	150,000	41
Weston	3,588	193,000	54
West Springfield	17,498	1,839,000	105
Weymouth	23,059	1,445,000	63
Whitman	7,638	292,000	38
Wilbraham	2,719	40,000	15
Wilmington	4,312	108,000	25
Winchester	13,411	966,000	72
WOBURN	20,072	1,603,000	80
WORCESTER	198,043	13,115,000	66
Wrentham	3,806	153,000	40
Yarmouth	1,951	32,000	16

The low per capita water consumption shown as prevailing in some of the small communities is due to the fact that the population of the entire town is used in the calculations instead of the population actually served and is not indicative of the actual per capita consumption.

Shortage of Water Supply

The only shortage of water supply reported throughout the State during the past year was that in the case of the town of Shrewsbury where a temporary pipe line was laid across the bridge at Lake Quinsigamond whereby water was supplied to Shrewsbury for about two weeks from the city of Worcester. This shortage was due probably to the reduced yield of the wells from clogging rather than to a deficiency in rainfall, and in accordance with the advice of the Department the town secured the services of an engineer. This engineer has submitted a report recommending certain changes in connection with the sources of water supply of this town, which if carried out should result in a sufficient amount of water being made available to meet the requirements of the town for a number of years in the future.

Rainfall and Flow of Streams

Rainfall

The following table shows the normal rainfall as deduced from the records of seven widely distributed stations having records for more than 59 years, also the rainfall for the year 1933, and the excess or deficiency of precipitation during each month as compared with the normal:

Month	Normal Rainfall (Inches)	Rainfall in 1933 (Inches)	Excess or Deficiency in 1933 (Inches)	Month	Normal Rainfall (Inches)	Rainfall in 1933 (Inches)	Excess or Deficiency in 1933 (Inches)
January	3.74	2.44	—1.30	August	4.18	4.39	+0.21
February	3.58	3.91	+0.33	September	3.53	10.61	+7.08
March	3.95	6.21	+2.26	October	3.71	3.75	+0.04
April	3.69	6.60	+2.91	November	3.84	1.61	—2.23
May	3.59	2.47	—1.12	December	3.67	3.60	—0.07
June	3.31	2.08	—1.23				
July	3.74	2.55	—1.19	Totals	44.53	50.22	+5.69

Sudbury River

The average yield of the Sudbury River in the year 1933 was 1.546 cubic feet per second, or 999,000 gallons per day, per square mile of drainage area. The normal flow of this river for the 59 years during which records have been maintained is 1.499 cubic feet per second, or 969,000 gallons per day, per square mile. The average daily yield for the past year for the six driest months, June to November, inclusive, was 344,000 gallons per day per square mile, or 12.5 per cent less than the normal.

The following table shows the relation between the average daily yield of the Sudbury River per square mile in each month in the year 1933 and the normal yield of the river during the past 59 years. The drainage area of the river at the point of measurement is 75.2 square miles.

Table showing the Average Daily Yield of the Sudbury River for Each Month in the Year 1933, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

Month	Normal Yield		Actual Yield in 1933		Excess or Deficiency	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.708	1.104	1.608	1.040	— .100	— .064
February	2.337	1.510	1.478	.955	— .859	— .555
March	4.111	2.657	4.550	2.941	+ .439	+ .284
April	3.077	1.989	5.682	3.673	+2.605	+1.684
May	1.678	1.084	1.127	.729	— .551	— .355
June	.797	.515	.184	.119	— .613	— .396
July	.307	.198	— .179	— .115	— .486	— .313
August	.331	.214	— .119	— .077	— .450	— .291
September	.407	.263	1.896	1.225	+1.489	+ .962
October	.616	.398	.827	.535	+ .211	+ .137
November	1.211	.783	.621	.401	— .590	— .382
December	1.469	.949	.940	.608	— .529	— .341
Average for whole year	1.499	.969	1.546	.999	+ .047	+ .030

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years, 1928 to 1933, inclusive, together with the average for a period of 59 years, are given in the following table:

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area

MONTH	1928			1929			1930		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	2.69	2.328	86.7	3.99	2.349	58.9	2.62	1.113	42.4
February	3.62	2.746	75.9	3.84	2.434	63.3	2.52	1.515	60.1
March	1.96	2.274	116.3	3.14	4.751	151.5	3.84	2.584	67.4
April	5.44	3.035	55.7	7.30	5.070	69.4	2.06	1.709	83.0
May	2.47	2.523	102.4	3.65	3.199	87.6	3.07	.722	23.5
June	6.36	2.736	43.0	1.65	.394	23.9	1.62	.077	4.8
July	5.46	2.170	39.7	0.90	—.198	—21.9	4.08	—.041	—1.0
August	4.50	.981	21.8	2.14	—.105	— 4.9	2.49	—.147	— 5.9
September	3.84	1.026	26.7	2.11	—.043	— 2.1	0.81	—.313	—38.5
October	3.52	.938	26.7	2.85	.097	3.4	4.37	.052	1.2
November	2.16	1.018	47.0	2.97	.439	14.8	4.36	.860	19.7
December	2.68	1.500	56.0	4.08	.630	15.5	2.56	.251	9.8
Totals and averages	44.70	23.275	52.1	38.62	19.017	49.2	34.40	8.382	24.4

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area—Cont.

MONTH	1931			1932			1933			Mean for Fifty-nine Years 1875-1933		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent Collected
January	3.95	.832	21.0	4.69	1.835	39.1	2.36	1.854	78.5	3.92	1.969	50.2
February	2.57	1.649	64.3	2.59	1.384	53.4	4.09	1.539	37.6	3.97	2.454	61.8
March	5.89	6.159	104.5	5,51	3.288	59.7	7.13	5.245	73.5	4.26	4.739	111.3
April	3.12	3.349	107.5	2.19	3.126	142.9	5.65	6.331	112.1	3.65	3.433	93.9
May	3.87	2.120	54.8	1.55	.819	52.8	2.49	1.300	52.1	3.22	1.934	60.1
June	7.18	3.405	47.4	3.28	.162	5.0	1.47	.205	13.9	3.28	.889	27.1
July	1.66	.557	33.5	1.92	—.175	— 9.1	2.13	—.206	— 9.7	3.60	.353	9.8
August	4.93	.229	4.6	5.21	.056	1.1	3.53	—.137	— 3.9	3.84	.382	9.9
September	1.19	—.176	—14.8	10.57	2.185	20.7	10.25	2.118	20.7	3.52	.454	12.9
October	2.23	—.048	— 2.1	6.59	3.067	46.6	2.98	.954	32.0	3.62	.710	19.6
November	0.95	.074	7.8	5.10	5.030	98.6	1.11	.693	62.4	3.78	1.351	35.7
December	3.29	.532	16.1	1.92	1.692	87.7	4.05	1.084	26.8	3.75	1.694	45.2
Totals and averages	40.83	18.682	45.7	51.12	22.469	43.9	47.24	20.980	44.4	44.41	20.362	45.8

The following table gives the record of the yield of the Sudbury River in gallons per day per square mile for each of the past six years and the mean for the past 59 years.

Yield of the Sudbury River Drainage Area in Gallons per Day per Square Mile[1]

MONTH	1928	1929	1930	1931	1932	1933	Mean for Fifty-nine Years, 1875-1933
January	1,305,000	1,317,000	624,000	466,000	1,029,000	1,040,000	1,104,000
February	1,645,000	1,511,000	940,000	1,024,000	830,000	955,000	1,510,000
March	1,275,000	2,664,000	1,449,000	3,453,000	1.843,000	2,941,000	2,657,000
April	1,760,000	2,941,000	991,000	1,943,000	1,814,000	3,673,000	1,989,000
May	1,414,000	1,793,000	405,000	1,188,000	459,000	729,000	1,084,000
June	1,585,000	228,000	45,000	1,972,000	94,000	119,000	515,000
July	1,217,000	—111,000	—23,000	312,000	—98,000	—115,000	198,000
August	550,000	—59,000	—83,000	129,000	31,000	— 77,000	214,000
September	594,000	—25,000	—181,000	—102,000	1,264,000	1,225,000	263,000
October	526,000	54.000	29,000	—27,000	1,719,000	535,000	398,000
November	589,000	254,000	498,000	43,000	2,914,000	401,000	783,000
December	841,000	353,000	141,000	298,000	949,000	608,000	949,000
Average for whole year	1,105,000	905,000	399,000	889,000	1,067,000	999,000	969,000
Average for driest six months	721,000	55,000	33,000	110,000	578,000	344,000	393,000

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[1] The drainage area of the Sudbury River used in making up these records included water surfaces amounting to about 2 per cent of the whole area from 1875 to 1878, inclusive, subsequently increasing by the construction of storage reservoirs to about 3 per cent in 1879, to 3.5 per cent in 1885, to 4 per cent in 1894, and to 6.5 per cent in 1898. The drainage area also contains extensive areas of swampy land, which, though covered with water at times, are not included in the above percentages of water surfaces.

Nashua River

The average yield of the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton during the year 1933 was 1,350,000 gallons per day per square mile of drainage area, or 24.6 per cent above the average for the past 37 years.

The average yield for the six driest months, June to November, inclusive, was 682,300 gallons per day per square mile of drainage area, or 20.6 per cent greater than the normal for this period.

There were large deficiencies in the yield during the months of May, June, July, November and December. The month of August was also deficient. The yield was considerably in excess of the normal in April and September. There also was an excess in yield in January, February, March and October.

The following table shows the normal yield of the South Branch of the Nashua River by months for the past 37 years, the actual yield in the year 1933, and the excess or deficiency in each month. The drainage area of the Nashua River above the point of measurement was 119 square miles from 1897 to 1907 and 118.19 square miles from 1908 to 1913, inclusive. Since January 1, 1914, the city of Worcester has been diverting water from 9.35 square miles of this drainage area for the supply of that city. The net drainage area tributary to Wachusett Reservoir is 108.84 square miles.

Table showing the Average Daily Yield of the South Branch of the Nashua River for Each Month in the Year 1933, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

Month	Normal Yield		Actual Yield in 193		Excess or Deficiency	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.792	1.158	2.015	1.302	+ .223	+ .144
February	1.986	1.284	2.359	1.525	+ .373	+ .241
March	3.899	2.520	4.057	2.622	+ .158	+ .102
April	3.498	2.261	7.482	4.836	+3.984	+2.575
May	1.984	1.282	1.684	1.089	— .300	— .193
June	1.261	.815	.665	.430	— .596	— .385
July	.710	.459	.348	.225	— .362	— .234
August	.644	.416	.489	.316	— .155	— .100
September	.638	.412	2.703	1.747	+2.065	+1.335
October	.759	.490	1.269	.820	+ .510	+ .330
November	1.256	.812	.926	.599	— .330	— .213
December	1.711	1.106	1.204	.778	— .507	— .328
Average for whole year	1.676	1.083	2.088	1.350	+ .412	+ .267

The rainfall on the Nashua River watershed and the total yield expressed in inches in depth upon the watershed (inches of rainfall collected) for each of the past six years, 1928 to 1933, inclusive, together with the average for the past 37 years, are given in the following table:

Rainfall, in Inches, received and collected on the Nashua River Drainage Area

Month	1928			1929			1930		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	3.03	2.657	87.7	4.80	2.140	44.5	2.11	1.156	54.8
February	3.92	3.014	77.0	4.28	2.310	54.0	2.20	1.396	63.5
March	2.08	2.291	110.3	3.40	4.912	144.5	3.65	2.146	58.7
April	5.30	3.679	69.4	5.83	4.953	84.9	1.88	1.646	87.8
May	2.92	2.946	100.8	4.62	3.851	83.3	2.77	1.039	37.5
June	6.64	3.575	53.8	3.09	1.020	33.0	2.96	.773	26.1
July	4.75	1.627	34.2	.85	.265	31.2	5.72	.808	14.1
August	5.07	1.179	23.2	1.50	.125	8.4	1.69	.399	23.5
September	3.83	1.117	29.1	2.00	.272	13.6	1.91	.406	21.3
October	1.99	.710	35.7	3.12	.427	13.7	3.55	.655	18.4
November	2.40	.776	32.4	3.14	.630	20.1	3.92	.810	20.7
December	2.08	1.199	57.6	3.30	.739	22.4	2.61	.661	25.4
Totals and averages	44.01	24.770	56.3	39.93	21.644	54.2	34.97	11.895	34.0

Rainfall, in Inches, received and collected on the Nashua River Drainage Area—Cont.

Month	1931			1932			1933			Mean for Thirty-seven Years 1897-1933		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per cent Collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	3.44	.881	25.6	5.71	3.024	53.0	2.71	2.323	85.8	3.64	2.066	56.7
February	2.71	1.103	40.7	3.14	1.906	60.7	4.78	2.457	51.4	3.80	2.084	54.9
March	5.00	4.545	90.9	5.25	3.218	61.3	5.92	4.677	79.0	4.02	4.495	111.8
April	2.98	4.001	134.2	2.10	4.234	201.1	6.39	8.336	130.5	3.87	3.903	100.9
May	5.01	2.258	45.1	1.58	1.260	79.7	2.58	1.942	75.2	3.29	2.287	69.6
June	6.07	3.089	51.0	2.27	.585	25.8	1.93	.742	38.5	3.77	1.407	37.3
July	2.71	.694	25.6	3.55	.383	10.8	2.16	.401	18.6	4.01	.819	20.4
August	6.95	1.083	15.6	4.23	.503	11.9	4.68	.564	12.0	4.07	.743	18.2
September	2.04	.517	25.3	7.31	.880	12.0	10.88	3.020	27.8	3.79	.712	18.8
October	2.46	.487	19.8	7.38	2.708	36.7	3.40	1.463	43.1	3.33	.875	26.3
November	1.35	.546	40.5	5.21	3.992	76.7	1.68	1.034	61.6	3.66	1.401	38.3
December	3.63	1.209	33.3	2.20	1.916	87.2	3.86	1.388	35.9	3.89	1.972	50.7
Totals and averages	44.35	20.413	46.0	49.93	24.609	49.3	50.97	28.347	55.6	45.14	22.764	50.4

The following table gives the record of the yield of the Nashua River watershed in gallons per day per square mile for each of the past six years and the mean for the past 37 years.

Yield of the Nashua River Drainage Area in Gallons per Day per Square Mile[1]

Month	1928	1929	1930	1931	1932	1933	Mean for Thirty-seven Years, 1897-1933
January	1,490,000	1,200,000	648,000	494,000	1,695,000	1,302,000	1,158,000
February	1,806,000	1,434,000	867,000	685,000	1,143,000	1,525,000	1,284,000
March	1,284,000	2,754,000	1,203,000	2,548,000	1,804,000	2,622,000	2,520,000
April	2,134,000	2,873,000	955,000	2,321,000	2,456,000	4,836,000	2,261,000
May	1,651,000	2,159,000	583,000	1,266,000	706,000	1,089,000	1,282,000
June	2,071,000	591,000	448,000	1,789,000	339,000	430,000	815,000
July	912,000	148,000	453,000	389,000	215,000	225,000	459,000
August	661,000	70,000	224,000	607,000	282,000	316,000	416,000
September	646,000	157,000	235,000	299,000	509,000	1,747,000	412,000
October	398,000	239,000	367,000	273,000	1,518,000	820,000	490,000
November	450,000	365,000	469,000	316,000	2,313,000	599,000	812,000
December	672,000	414,000	371,000	678,000	1,074,000	778,000	1,106,000
Average for whole year	1,176,000	1,031,000	566,000	972,000	1,169,000	1,350,000	1,083,000
Average for driest six months	624,000	232,000	353,000	428,000	597,000	682,300	565,600

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[1] The drainage area used in making up these records included water surfaces amounting to 2.2 per cent of the whole area from 1897 to 1902, inclusive, to 2.4 per cent in 1903, to 3.6 per cent in 1904, to 4.1 per cent in 1905, to 5.1 per cent in 1906, to 6 per cent in 1907, to 7 per cent in 1908, 1909 and 1910, to 6.5 per cent in 1911, to 6.8 per cent in 1912, to 7 per cent in 1913, to 7.4 per cent in 1914 and 1915, to 7.6 per cent in 1916, to 7.4 per cent in 1917 and 1918, to 7.5 per cent in 1919, 1920, 1921 and 1922, to 7.4 per cent in 1923 and 1924, to 6.4 per cent in 1925, to 5.9 per cent in 1926, to 5.7 per cent in 1927, to 7.6 per cent in 1928, to 7.4 per cent in 1929, to 5.6 per cent in 1930, to 6 per cent in 1931, to 7.3 per cent in 1932, and 7.6 per cent in 1933.

Merrimack River

The Merrimack River is the second in size of the streams of Massachusetts. The river rises in the White Mountains of New Hampshire and flows southerly through the central part of that State until it enters Massachusetts, where it turns to the east and flows in a general northeasterly direction the remainder of its course to the sea. The total length of its watershed from its extreme northerly limits in the mountains of northern New Hampshire to its extreme southerly limits in the hills of Hopkinton, Massachusetts, is about 137 miles and its extreme width about 66 miles. Its total drainage area above its mouth at Newburyport is about 5,000 square miles, of which about one-quarter is within the limits of Massachusetts and the remainder within the State of New Hampshire.

Records of the flow of the Merrimack River have been kept continuously at Lawrence since 1880. The drainage area of the river at that point is 4,663 square miles, including 118.19 square miles tributary to the South Branch of the Nashua River used for the water supply of the Metropolitan District and in part for the city of Worcester, 75.2 square miles on the Sudbury River, and 18 square miles tributary to Lake Cochituate. The flow as measured at Lawrence includes the water wasted from these drainage areas. In presenting the record of the flow of the river these drainage areas have been deducted, leaving the net drainage area above Lawrence 4,567 square miles in 1880, 4,570 square miles in the years 1891 to 1897, inclusive, and 4,452 square miles since the latter year. The quantity of water overflowing from the Cochituate and Sudbury watersheds as measured by the Metropolitan District Commission has also been deducted from the flow of the river as measured at Lawrence. The average flow of the river during the year 1933 amounted to 1.745 cubic feet per second per square mile, which is about 20.4 per cent more than the normal for the past 54 years. The flow was more than the normal during the months of January, April, September, October, November and December. The greatest deficiency occurred in June.

The following table shows the relation between the normal flow of this stream during the past 54 years and the actual flow during each month of the year 1933:

Table Showing the Average Monthly Flow of the Merrimack River at Lawrence for the Year 1933; also the Normal and Departure therefrom in Cubic Feet per Second per Square Mile of Drainage Area.

Month	Normal Flow, **1880-1933**	Actual Flow in **1933**	Excess or Deficiency
January	1.256	1.333	+ .077
February	1.328	1.295	— .033
March	2.693	2.392	— .301
April	3.577	7.363	+3.786
May	2.220	2.144	— .076
June	1.247	.816	— .431
July	.754	.406	— .348
August	.646	.509	— .137
September	.650	.971	+ .321
October	.796	1.367	+ .571
November	1.141	1.157	+ .016
December	1.077	1.187	+ .110
Average for whole year	1.449	1.745	+ .296

The following table gives the record of the flow of the Merrimack River at Lawrence for each of the past six years, together with the average flow in the past 54 years, this amount being expressed in cubic feet per second per square mile of drainage area.

Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile

Month	1928	1929	1930	1931	1932	1933	Mean for Fifty-four Years, 1880-1933
January	2.039	1.537	.861	.423	1.803	1.333	1.256
February	2.069	1.487	.949	.478	1.301	1.295	1.328
March	2.048	3.649	2.242	1.603	1.363	2.392	2.693
April	3.437	3.993	2.035	3.665	4.454	7.363	3.577
May	3.160	3.424	1.172	1.897	1.319	2.144	2.220
June	2.300	.973	1.055	2.207	.493	.816	1.247
July	1.636	.583	521	.756	.499	.406	.754
August	1.550	.400	.520	.520	.483	.509	.646
September	1.500	.365	.378	.471	.673	.971	.650
October	.977	.408	.311	.471	1.223	1.367	.796
November	.979	.409	.562	.621	2.431	1.157	1.141
December	1.115	.488	.518	.973	1.157	1.187	1.077
Average for whole year	1.901	1.484	.927	1.174	1.433	1.745	1.449
Average for driest six months	1.293	.457	.468	.635	.782	.871	.844

Sudbury, Nashua and Merrimack Rivers

The following table shows the weekly fluctuations during the year 1933 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton, and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 118.19 square miles, and of the Merrimack River at Lawrence 4,567 square miles.

Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1933, in Cubic Feet per Second per Square Mile of Drainage Area

Week ending Sunday —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	Week ending Sunday —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 1	2.233	2.507	1.388	July 2	1.123	.369	.611
8	1.883	1.443	1.179	9	— .098	.409	.422
15	1.783	2.200	1.173	16	— .186	.424	.425
22	1.572	2.556	1.262	23	.311	.279	.396
29	2.028	2.084	1.772	30	— .195	.349	.393
Feb. 5	2.352	1.606	1.221	Aug. 6	.525	.621	.398
12	3.078	2.308	1.192	13	— .358	.208	.389
19	.858	1.716	1.115	20	.473	.273	.415
26	2.219	3.640	1.569	27	.132	.725	.658
Mar. 5	2.332	2.219	1.401	Sept. 3	.169	.633	.576
12	6.162	4.151	2.591	10	.627	.876	.468
19	4.466	3.821	2.395	17	2.820	5.853	.581
26	5.265	4.656	2.674	24	5.144	3.583	1.876
Apr. 2	4.635	6.389	3.093	Oct. 1	.757	1.158	1.238
9	6.111	9.484	7.465	8	.546	1.403	1.190
16	6.425	7.473	6.248	15	1.832	1.253	1.491
23	8.146	8.939	11.253	22	.995	1.109	1.221
30	3.967	3.451	5.440	29	1.075	1.460	1.553
May 7	2.116	2.421	3.724	Nov. 5	1.870	.849	1.461
14	1.383	1.754	2.217	12	1.986	.753	1.137
21	.767	1.452	1.700	19	1.914	.828	1.093
28	.599	1.044	1.399	26	1.425	1.077	1.027
June 4	3.854	1.412	1.174	Dec. 3	.851	1.195	1.317
11	.780	1.059	.933	10	.554	1.172	1.493
18	1.104	.417	.687	17	.788	.904	1.021
25	.924	.414	.655	24	.834	1.577	1.031
				31	1.349	1.231	1.111

Note: For drainage areas used see previous pages.

EXAMINATION OF RIVERS

The principal rivers of the State have been examined as usual during the year and samples have been collected during the six months, June to November, inclusive. In general the decrease in industrial activities in certain parts of the State has resulted in an improvement in the sanitary condition of many of the rivers.

Aberjona River

Much consideration has been given by the city of Woburn and the State and Federal governments during the past year to the extension of the Aberjona River sewer to North Woburn so that the wastes from certain industries in this part of the valley can be removed to the Metropolitan sewerage system. The city has taken all possible action to properly finance the extension of this sewer, and in view of this activity it has not seemed advisable for this Department to proceed under the provisions of Chapter 291 of the Acts of 1911 against any of the industrial works to provide the necessary methods of treatment. Favorable action was taken by the Federal government at the end of the year to properly finance the extension of this sewer, and a contract was about to be awarded at the end of the year. There has been the usual evidence of discoloration due to the seepage from the deposits of iron pyrites at the abandoned chemical plant in North Woburn, and the upper waters of the river have been seriously polluted by tannery wastes. The results of the analyses of samples of water from the river in the lower part of its course show an improvement from earlier conditions, but in parts of its course the river is still objectionable.

Assabet River

The analyses have shown an improvement in the character of this stream below the Westborough filter beds, though inspections have shown that this portion of the river during the drier part of the year was badly affected by the growth of microscopic organisms. There was little change below Hudson, but below Maynard and above West Concord the river was not in as good condition as in the last two or three years. The effect of the improvement in the methods of sewage and industrial waste disposal at the Massachusetts Reformatory, however, has apparently produced a gradual improvement in the condition of the Assabet River at its mouth.

Blackstone River

For many years there has been much agitation relative to the pollution of the tributary of the Blackstone River passing through Cherry Valley in Leicester and Worcester. This portion of the river has been in a deplorable condition during the past year due very largely to industrial wastes from the intensely developed industrial district in Cherry Valley, and the analyses have shown this stream to be one of the most seriously polluted of any of the streams in the State. The main stream just below the Worcester sewage treatment works has shown a slight improvement over the last two or three years, although there was a greater amount of iron in the stream than in 1932 due very likely to an increase in business activity in the industries near the river in the city of Worcester. The stream has been less satisfactory below Millbury and lower down in its course than in 1932, but the analyses do not show as serious pollution as in earlier years.

Charles River

There has been a gradual increase in the amount of pollution below Milford and also in Mine Brook below Franklin due to the discharge of improperly purified sewage from the sewage treatment works in both of these municipalities. There has been little change during the last two or three years in the lower portion of the course of this stream. Nevertheless the effect of sewage pollution from both Milford and Franklin on the sanitary condition of the stream is increasing and in order to protect this stream, which in a sense is a water supply stream, from pollution, the important improvements in the treatment of the sewage in these two municipalities already recommended should be effected as soon as practicable.

Chicopee River

There has been but little change in the condition of the Quaboag River during the past year, but the analyses have shown a slight improvement in the condition of the Ware River. The main stream below the confluence of its three main tributaries was in a satisfactory sanitary condition so far as the Department's analyses and observations are concerned. The effect of the diversion of water from the Ware River by the Metropolitan District Water Supply Commission on one of the large industries in the valley was the subject of an extensive litigation during the latter part of the year.

Concord and Sudbury Rivers

The analyses of Bannister Brook, which receives the effluent and unpurified sewage from the sewage treatment works of the towns of Framingham and Natick, have shown more pollution than in any year since 1928. As indicated in another part of this report, an effort has been made toward the construction of a joint sewage treatment works by the two municipalities mentioned above. The town of Framingham has made certain minor improvements but not of a permanent character, and modern, substantial sewage treatment works are necessary for this large municipality. The town of Natick has presented satisfactory plans for sewage treatment works and has taken suitable town meeting action. The results of the analyses of samples of the Sudbury River below Saxonville during the last few years have shown a gradual increase in pollution. During the summer a complaint was made by persons using the Sudbury River for recreational purposes, and it was found necessary to recommend that suitable action be taken at a large industrial plant at Saxonville to remove its wastes from this stream.

Connecticut River

There has been no material change in the character of this large stream in the upper portion of its course in Massachusetts. The Manhan River, which receives much of the sewage from the town of Easthampton, has shown an increase in pollution, and the Mill River is very seriously polluted by the discharge of large quantities of sewage from the city of Northampton. The results of the analyses of samples of water from the Connecticut River below Springfield have shown more organic matter than in any year since the sampling was begun. A complaint was made during the year relative to the discharge of sewage near the bank of the river from one of the large sewer outlets in Springfield, and the Department found it necessary in a communication dated September 12, 1933, to recommend the extension of a submerged outlet to take the dry weather flow of sewage from this sewer into the current of the stream where the outlet will be submerged at all times. During the latter part of the year the recreational and fishing interests started a considerable agitation relative to the removal of sewage from the Connecticut River and its tributaries. The Department is interested in the protection of the public health in the valley of the Connecticut River and has collected a considerable amount of information relative to the sanitary condition of that river and its tributaries. In this connection the Department offers such information as it has collected to persons interested in this question provided of course that the information is not to be used in litigation. The result of any discussion relative to the improvement of the Connecticut River and its tributaries should be a program looking to the removal of the sewage from these streams, the first portion of which should be a comprehensive engineering study providing for the collection of the sewage and its proper treatment.

French River

The French River below Webster and Dudley is badly polluted by sewage and industrial wastes, and the analyses during the past year have shown no change from former conditions.

Hoosick River

The analyses of the Hoosick River show more pollution below Adams than for many years. There has also been an increase in pollution of the North Branch of the river in its passage through North Adams. The main stream below North Adams has shown more evidence of pollution than in any year since 1930, while at Williamstown the amount of organic matter in the water as shown by the albuminoid ammonia determination has been greater than at any time since the Department started taking samples many years ago.

This last year has shown a marked activity on the part of Adams and North Adams to correct the foul condition of this stream. The city of North Adams has retained engineers, and plans have been forwarded to this Department for the construction of an intersepting sewer and partial treatment works. The preliminary plans were found to be satisfactory, and presumably the city will proceed under Federal funds to construct the necessary works during the coming year. Similarly the town of Adams during the latter part of the year showed considerable interest in this matter and retained an engineer. It is to be assumed that this town will also attempt to obtain Federal funds for the construction of sewage treatment works.

Housatonic River

The analyses have shown very little change in the sanitary condition of this stream during the past year, but the inspections have shown considerable industrial pollution in Pittsfield. Apparently less raw sewage has been allowed to overflow from the Pittsfield sewerage works than in earlier years, but nevertheless the analyses of the effluent have shown that the sewage has been poorly purified, and there is evidence of the lack of proper treatment of this sewage in the course of the stream below Pittsfield.

Merrimack River

In accordance with the provisions of Chapter 202 of the Acts of 1929, the Merrimack River has been examined from time to time during the year. The results of the analyses have shown more evidence of pollution above Lawrence than in any recent year with the exception of the year 1930. Below Lawrence there has been more evidence of pollution than in any year since 1915, and this increase in pollution is noticeable above Haverhill, while the amount of organic matter present in the river water below Haverhill and at Amesbury has averaged more than in any year since the sampling was begun many years ago. There has been some discussion during the past summer relative to the improvement of the Merrimack River, but no definite action has been taken.

Under the provisions of General Laws, Chapter 130, as appearing in Chapter 329 of the Acts of 1933, the Department has been requested to determine the sources of pollution of the contaminated shellfish areas at the mouth of the Merrimack River in Newburyport, Salisbury and Newbury, and the proportion in which the cities and towns within the Commonwealth are causing or contributing to such pollution. This investigation required a considerable amount of time and was well under way at the end of the year.

Millers River

This stream is polluted from time to time by sewage and improperly purified effluent from the sewage treatment works of the city of Gardner. The results of the analyses showed a slight improvement below Gardner during the past year due apparently to an extension of the sewage treatment works at Gardner.

Nashua River

The analyses show that the North Branch of the Nashua River below Fitchburg, but above the sewage treatment works, has been more polluted during 1933 than in any year since 1930, while above Leominster a slight improvement in the condition has been noticeable. No material change was noted below Leominster, nor was there any particular change in the South Branch above and below Clinton. The analyses from the main stream in Groton show more evidence of pollution than in any recent year.

As indicated elsewhere in this report, the courts have ordered the city of Leominster to remove its sewage from the river before February 1, 1938, and plans are now being prepared for sewage treatment works. There has been some interest during the year in the treatment of industrial wastes from some of the larger paper mills in Fitchburg where the river is seriously polluted, and it is to be assumed that action will be taken during the coming year to relieve this portion of the stream from the serious pollution which it now receives.

Neponset River

As was anticipated in the last annual report, the condition of the Neponset River has shown a vast improvement during the year because of the availability of the Neponset River Valley sewer of the Metropolitan sewerage works for the removal of sewage and industrial wastes formerly discharging into this stream. Plans have been approved for the construction of sewers in Walpole, Stoughton and Canton, and partial systems of sewerage have been completed in these towns. Authorization was given for the connection of the Canton and Stoughton sewerage systems to the Neponset River Valley sewer on July 1, 1933. The Stoughton system has not yet come into general use. Much consideration was given during the year to the removal of the sewage from the Massachusetts Hospital School in Canton to the Canton sewerage system, and funds were made available for this work late in the year.

North River, Salem and Peabody

This stream has shown more evidence of pollution than in any year since sampling was begun, and the analyses of samples taken at the mouth show that the river contained an average of 9.1 parts per million of albuminoid ammonia, or more putrescible organic matter than the sewage collected in many municipal sanitary sewerage systems. The average amount of suspended solids was 351 parts in a million which is also greater than the amount contained in most of the municipal sewages. There was somewhat less evidence of pollution at Howley Street than last year, but nevertheless at this point the stream was in a worse condition than any other stream in Massachusetts, and the average amount of suspended solids at this point was 108 parts in a million.

The Department has again found it necessary to recommend certain changes at the pumping station of the South Essex sewerage works in Salem in order that the sewage and industrial wastes now discharging into the North River may be properly removed in the Salem-Peabody sewer. Legislation will apparently be necessary in order to provide the proper changes, and it is hoped that suitable action will be taken during the coming year.

Quinebaug River

The analyses of the Quinebaug River below the Southbridge sewage treatment works show more evidence of pollution than in any year since 1930, and it has been necessary to recommend an extension of the Southbridge treatment works.

Taunton River

The usual samples have been taken from the Taunton River and its various tributaries. The analyses show more evidence of pollution than in 1932 but not as great an amount of pollution as in some of the earlier years. Complaint has been made during the last two years of the pollution of the Salisbury Plain River by the discharge from certain surface drains within the limits of the city of Brockton. During the year the Department has held various conferences with the Brockton city authorities and industrial concerns, and experiments have been carried on relative to the treatment of the wastes from the Brockton Gas Light Company, with the result that the Department has recommended that the wastes from the ammonia still liquors at this plant be discharged into the sanitary sewerage system of the city of Brockton. This matter has been before the Department for some time, and while the engineering features relative to the discharge of these wastes into the sewer have been completed a suitable contract between the city and the gas company had not been signed at the end of the year.

Examinations of the other streams in the State have shown no particular change during the year.

MUNICIPAL SEWAGE TREATMENT WORKS

All of the sewage treatment works have been examined during the year, and samples of the sewage, settled sewage and effluent have been collected and analyzed at frequent intervals. The Department has notified the officials of most of the municipalities during the year as to the desirability of obtaining Federal funds for reconstruction and enlargement of their sewage treatment works.

At Attleboro the sewage is discharged onto the sand filters without preliminary treatment. The sewage treated at these works has been heavier this last year than any year since 1928, and the amount of suspended matter is excessive for a municipal sewage applied directly to sand filters. During the year the filter beds were partially reconstructed, but the results have not been satisfactory and in a communication sent to the city under date of November 16, 1933, the Department recommended that plans be prepared for the preliminary treatment of the sewage and an increase in the area of the filter beds to at least 20 acres. More even distribution of the sewage was also recommended.

At Brockton the works are carefully supervised under local laboratory control, and the usual standard of efficiency has been maintained.

At Clinton the works are ofinadequate capacity and continue to be inefficient. Much of the sewage is poorly purified and the effluent contains a considerable quantity of iron. The construction of a more modern treatment works is necessary in order to prevent offensive conditions in the vicinity of these works and in the water courses into which the effluent and untreated sewage discharge.

At Concord the inspections show that a more even distribution of the sewage is desirable.

At Easthampton as in former years large quantities of sewage were allowed to discharge into the Manhan River with no treatment other than sedimentation.

At Fitchburg the treatment works have been operated under expert supervision, and the sewage has been well purified. Toward the end of the year the construction of an additional area of sludge beds was begun. This is a satisfactory sewage treatment works capable of handling considerable quantities of sewage in excess of the quantities now treated.

The sewage from the town of Framingham as discharged to the disposal works has shown an increase in strength over 1932, and the effluent has shown a smaller degree of purification. Subsequent to the investigation of a complaint relative to the condition of Bannister Brook a year ago, plans were submitted to this Department for an extension of the area of filter beds, and the construction of five new filters was begun with welfare labor. These new beds were finished this year and have been largely responsible for the overflow of less untreated sewage to Bannister Brook than in 1932. During the year four of the filter beds constructed in 1924 were reconditioned, thus completing the reconstruction of nine of the sixteen filter beds constructed in 1924. The conferences held in 1932 relative to improvements in the Natick and Framingham sewage treatment works have not been satisfactory so far as the construction of joint works is concerned, but the town of Natick has submitted a satisfactory plan for sewage treatment works, and suitable action was taken at a town meeting during the year. As indicated above, the town of Framingham has made certain improvements in its sewage treatment works during the year, but with this nearly obsolete plant, being one of the oldest in the country, these improvements at best can be considered only temporary. Accordingly, for this reason and also in view of the fact that one of the principal arteries out of Boston passes between the Natick and Framingham sewage treatment works, it seems important that a plan, report and estimate of cost of modern, substantial sewage treatment works be prepared by the town of Framingham so that the matter of preventing offensive odors and the pollution of the waterways in this growing district may be corrected as early as practicable.

The sewage disposal works of the town of Franklin have received more attention the past year than during other recent years, but the results of the analyses of samples of the final effluent show no material change in quality over that of previous years. Late in the year the Department found it necessary to advise the town that unless the works are more efficiently operated the Department's only option is to proceed under the provisions of General Laws, Chapter 83, Section 7. Following this the Sewer Commissioners began the reconstruction of two of the filter beds under a Civil Works Administration grant. The work was not completed at the end of the year.

At Gardner, at the plant known as the Templeton area, additional filter beds were completed during the year, increasing the aggregate area by four acres. A suitable measuring device should be installed at this plant.

At Hopedale the sewage disposal works are of adequate capacity and are efficiently operated. The results of the analyses of the effluents show that the sewage has been reasonably well purified.

At Hudson a special examination of the sewage filter beds was made during the latter part of the year. The investigation showed that there was little or no surface clogging of the beds but that the underdrains were submerged the greater part of the time. The Department has advised the relaying of the underdrains at a slightly higher elevation. This work is awaiting final Public Works Administration approval. Additional filter beds also should be constructed at no far distant date.

The sewage disposal works at Leicester are still inadequate for the disposal of the sewage of the town and the results are unsatisfactory. Sewage overflows into the adjacent brook in considerable quantities during the winter months and in wet weather.

The city of Leominster continues to discharge crude sewage into the North Branch of the Nashua River. Considerable work in removing storm water from the sanitary sewers was done last year, and a large amount of sewage was diverted to the small disposal works near Mechanics Street. A special act of the Legislature, Chapter 355, was enacted during the year which authorizes the city of Leominster to construct and operate a system or systems of sewers and of sewage disposal. The Superior Court's final decree in Lancaster vs. Leominster was entered during the year. Under this decree the city of Leominster is enjoined from discharging any raw sewage, improperly purified effluent, or any other impurities, into the North Branch of the Nashua River or its tributaries after February 1, 1938. A Special Sewer Committee has been appointed and engineers have been selected for carrying out the necessary works. It is understood that this proposed project is now before the Federal authorities for the approval of funds. This should enable the city of Leominster to comply with the court order and the various recommendations of the Department of Public Health.

At Marion the construction of settling tanks, a dosing tank and additional sand filters in 1930 has effected an improvement in the treatment of the sewage of the town. Some of the filters have been resurfaced during the year. While the results of the analyses of samples of effluent show that the sewage is reasonably well purified, more attention to the operation of the filter beds is necessary, and additional filter beds will be needed at this plant at no far distant date.

The results of the analyses of samples of the final effluent at Marlborough show that the efficiency of the sewage disposal works is still considerably reduced. The reconstruction of the filter beds which was begun with welfare labor in 1932 has been continued as a Public Works Administration project. Thirteen beds were completed and one other nearly finished. The reconstruction of the other ten beds will probably be carried on in the spring. As a result of this reconstruction the effective working area of filtration has been reduced. The work should be continued until all of the beds have been reconditioned.

At Maynard the disposal works are operated without expert supervision, but the analyses of the final effluent show that the sewage has been reasonably well purified.

The sewage disposal works in the town of Milford consist of sedimentation tanks, sand filter beds, an Imhoff tank, a trickling filter and a secondary tank. These works are operated without expert supervision, and the results are very unsatisfactory. The material in the sand filter beds is very fine, and an examination by means of test pits dug in the beds shows that the underdrains are badly clogged. The sewage is not well distributed over the sand filters and the beds are overloaded. The Imhoff tank-trickling filter plant is not operated satisfactorily and should be enlarged. Toward the end of the year an application was made for Civil Works Administration funds for the construction of another Imhoff tank and trickling filter without favorable results because of the fact that the work could not be completed before February 15. Extension of the sewage treatment works should be made without further delay and the works should be operated under expert supervision.

At Natick the sewage disposal works still remain inadequate for the effective purification of the sewage. Sewage was allowed to overflow to the swamp land south of the filter beds during a portion of the year. As indicated above, plans for new sewage treatment works were submitted and recommended for adpotion by this Department in August 1933. Legislation is now necessary before the works can be constructed.

The filter beds at Nantucket, consisting of coarse sand, are frequently covered in part by materials blown in by the heavy winds. This material and the accumulating sludge should be removed at frequent intervals, and the sewage should be more evenly distributed over the various filter beds.

At North Attleborough the enlargement of the sewage disposal works in 1930 and the reconstruction of three old beds in the past three years have resulted in some improvement in the efficiency of the works. Further enlargements and reconstruction are necessary in the immediate future.

At Northbridge, while the disposal works are operating at maximum capacity, the analyses of the final effluent show that the sewage has been reasonably well purified due to the efficient handling of the disposal works.

The sewage disposal works at Pittsfield continue to show very unsatisfactory results. During the past summer several of the filter beds were reconstructed by removing surface material and replacing it with clean material. This work showed many of the filters to consist of very fine sand and the underdrains to be clogged in many places. This work provides only a temporary relief, and the plans for permanent works as approved by this Department in 1930 should be carried out without further delay. The matter of financing this work under Federal funds was being given consideration at the end of the year.

At Southbridge the sewage disposal works are inadequate for the proper treatment of the sewage of the town. Much sewage is allowed to overflow into the Quinebaug River and the works are not efficiently operated. An enlargement of these works or the construction of a more modern form of treatment works is necessary to prevent offensive conditions in the vicinity. The Department recommended such action in a communication dated November 16, 1933.

The Spencer sewage disposal works are not adequate for the proper disposal of all of the sewage of the town and the works are not efficiently operated. Considerable sewage overflows into Seven Mile River especially at times of storm.

At Stockbridge the disposal works are not efficiently operated, and enlargement and reconstruction of these works should be made under proper engineering supervision.

The disposal works at Westborough have been operated in a reasonably satisfactory manner.

At Winchendon the disposal works are well operated, and the analyses of the effluent show that the sewage has been reasonably well purified. During the year the Department recommended the installation of a measuring device to determine the flow of sewage as discharged to the filter beds.

The sewage treatment works of the city of Worcester are under expert supervision, and the results of the analyses of samples of the final effluent as it discharges into the Blackstone River show that the sewage is well purified. Late in the year the city authorities submitted certain plans to the Department providing for two secondary sludge concentration tanks, certain gates on the trickling filter effluent lines and other improvements. It appears that the sludge drawn from the secondary tanks contains an excessive amount of water which prevents prompt drying of the sludge, and the purpose of the tanks is to provide for the removal of the supernatant water before the sludge is discharged upon the drying beds. Under the present arrangement it is difficult to seal the underdrain lines so as to provide for flooding the filters when and if required, and the purpose of the proposed gates on the effluent lines is to overcome this difficulty. The plans were found to be satisfactory, and presumably these improvements will be installed shortly.

The results of the Department's analyses and the records of operation of the larger municipal sewage treatment works are given in the appended tables.

TABLE NO. 1.—*Average Results of the Analyses of Monthly Samples of Sewage as received at Disposal Works. (Fats determined in about 57 per cent of the Samples)*

[Parts per Million]

CITY OR TOWN	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	OXYGEN CONSUMED		IRON		Kjeldahl Nitrogen	Fats
	TOTAL RESIDUE			LOSS ON IGNITION			Free	ALBUMINOID									
	Total	Dissolved	Suspended	Total	Dissolved	Suspended		Total	Dissolved	Suspended		Unfiltered	Filtered	Unfiltered	Filtered		
ATTLEBORO[1]	357.7	265.0	92.7	181.0	100.7	80.3	31.37	4.58	2.59	1.99	31.9	42.0	27.7	1.80	.93	10.4	–
BROCKTON[2–3]	685.0	450.8	234.2	348.5	161.0	187.5	42.23	6.85	3.05	3.80	94.1	91.1	49.7	1.39	.44	14.9	38.7
Clinton[3]	657.2	340.3	316.9	423.7	159.2	264.5	29.32	7.92	4.80	3.12	45.5	67.7	40.0	2.54	.63	15.3	91.1
Concord[1]	235.3	198.0	37.3	109.7	75.7	34.0	11.65	1.77	1.16	.61	24.1	22.7	16.0	.61	.34	4.8	–
Easthampton[1]	543.3	389.3	154.0	332.3	195.0	137.3	37.77	6.46	4.29	2.17	44.7	69.8	51.9	1.13	.32	13.4	–
FITCHBURG	331.6	222.4	109.2	189.2	94.0	95.2	17.70	2.59	1.85	.74	26.3	47.4	25.6	1.80	.97	6.9	67.1
Framingham (Imhoff)[4]	819.2	549.7	269.5	429.5	212.0	217.5	35.98	10.00	6.07	3.93	64.4	82.2	54.3	2.47	1.02	20.8	122.1
Framingham[3]	806.3	500.0	306.3	495.0	249.7	245.3	32.50	8.65	5.76	2.89	57.3	108.3	72.5	2.65	.94	20.2	121.1
Franklin[1]	332.7	294.0	38.7	105.3	79.0	26.3	26.20	2.42	1.70	.72	40.8	25.5	17.5	.71	.44	6.1	–
GARDNER (Gardner Area)[2]	662.5	413.5	249.0	399.0	183.5	215.5	51.55	13.93	7.81	6.12	58.5	92.8	60.3	1.85	.51	23.1	104.9
GARDNER (Templeton Area)	627.5	412.0	215.5	371.0	179.5	191.5	76.45	11.59	6.97	4.62	58.0	87.0	51.1	1.83	.68	23.5	107.0
Hopedale[2]	790.5	463.5	327.0	461.5	185.5	276.0	50.55	9.43	5.83	3.60	45.7	92.8	49.8	4.75	.51	23.6	–
Hudson	681.6	422.4	259.2	420.8	204.2	216.6	77.00	11.50	7.01	4.49	52.4	102.0	52.6	2.19	.59	26.8	115.6
Leicester[1]	320.6	228.3	92.3	171.3	98.3	73.0	35.63	5.25	3.47	1.78	25.0	39.4	23.5	.81	.25	13.5	–
Marion[5]	360.0	170.0	190.0	242.4	65.6	176.8	12.64	1.92	1.18	.74	26.0	28.5	15.7	1.36	.39	5.2	–
MARLBOROUGH[1]	601.3	405.0	196.3	366.0	188.3	177.7	47.23	7.75	4.95	2.80	45.7	70.5	39.5	1.33	.49	16.4	95.7
Maynard	1188.4	399.8	788.6	900.4	201.1	699.3	63.16	19.61	9.48	10.13	48.2	157.3	54.5	2.88	.74	43.2	–
Milford	989.4	382.0	607.4	718.7	157.8	560.9	38.20	7.64	5.11	2.53	50.4	76.2	38.3	1.43	.42	15.1	–
Natick[3]	712.9	392.4	320.5	433.1	159.3	273.8	44.15	9.15	5.48	3.67	49.9	80.8	38.5	1.73	.45	17.6	103.1
North Attleborough[1]	346.3	214.7	131.6	188.6	79.7	108.9	16.15	4.01	1.92	2.09	23.2	37.8	20.6	1.43	.68	8.4	–
Northbridge	415.5	270.2	145.3	245.5	120.7	124.8	40.44	6.34	4.16	2.18	34.7	58.7	34.4	1.61	.43	13.9	–
PITTSFIELD[3]	476.4	326.0	150.4	263.1	138.2	124.9	29.06	5.42	3.45	1.97	32.9	54.7	31.6	1.94	.79	11.2	46.6
Southbridge[1]	646.7	411.3	235.4	395.0	204.3	190.7	50.57	10.28	5.39	4.89	47.2	87.3	49.0	1.47	.50	19.1	107.7
Spencer[1]	522.3	314.7	207.6	329.6	155.3	174.3	32.40	7.88	5.07	2.81	33.4	91.3	42.2	1.65	.47	15.8	72.2
Stockbridge[2]	318.8	265.6	53.2	165.2	120.0	45.2	18.96	2.47	1.69	.78	17.5	28.2	20.6	.68	.44	5.9	–
Westborough	847.0	372.8	474.2	529.0	183.7	345.3	42.93	13.26	6.27	6.99	41.1	97.1	42.6	2.37	.57	27.2	127.9
Winchendon[2]	488.0	317.0	171.0	289.5	144.5	145.0	36.15	7.30	4.40	2.90	39.9	66.3	37.3	2.75	1.00	12.6	–
WORCESTER[6]	840.0	520.0	320.0	325.0	106.0	219.0	24.10	5.85	2.28	3.57	97.3	81.0	33.0	31.00	3.10	14.8	69.5

[1] Six samples.
[2] Four samples.
[3] At Pumping Station
[4] Entrance to Imhoff tanks, including Saxonville sewage.
[5] Five samples.
[6] Two samples.

TABLE No. 2.—*Average Results of the Analyses of Monthly Samples of Sewage as Applied to Filter Beds after Preliminary Treatment as Indicated. (Fats determined in about 57 Per Cent of the Samples.)*

[Parts per Million]

City or Town	Form of Preliminary Treatment	Residue on Evaporation						Ammonia				Chlorine	Oxygen consumed		Iron		Kjeldahl Nitrogen	Fats
		Total residue			Loss on ignition				Albuminoid									
		Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended		Unfiltered	Filtered	Unfiltered	Filtered		
ATTLEBORO[1]	None	357.7	265.0	92.7	181.0	100.7	80.3	31.37	4.58	2.59	1.99	31.9	42.0	27.7	1.80	.93	10.4	-
BROCKTON[2]	Tanks	471.6	376.0	95.6	215.6	135.6	80.0	41.24	4.42	2.16	2.26	76.6	58.5	34.1	.99	.48	10.5	35.6
Clinton	Basins	275.3	240.4	34.9	111.8	82.9	28.9	22.00	2.95	2.07	.88	36.7	24.4	17.0	1.45	.81	6.6	23.6
Concord[1]	None	235.3	198.0	37.3	109.7	75.7	34.0	11.65	1.77	1.16	.61	24.1	22.7	16.0	.61	.34	4.8	-
Easthampton[1]	Tanks	496.0	363.3	132.7	281.0	163.3	117.7	37.97	5.72	3.48	2.24	44.3	57.2	40.7	1.03	.36	10.9	-
FITCHBURG	Tanks[3]	258.4	222.4	36.0	120.0	92.8	27.2	18.22	2.69	1.75	.94	26.8	33.9	20.4	2.17	1.01	6.1	27.0
Framingham	Tanks[3]	452.5	396.0	56.5	213.7	164.3	49.4	40.82	4.89	3.57	1.32	52.7	48.6	35.6	1.52	.94	11.6	50.3
Franklin[1]	Tanks	393.0	338.3	54.7	106.7	93.3	13.4	22.23	2.41	1.93	.48	111.8	23.6	18.4	.68	.44	6.5	-
GARDNER (Gardner Area)[2]	None	662.5	413.5	249.0	399.0	183.5	215.5	51.55	13.93	7.81	6.12	58.5	92.8	60.3	1.85	.51	23.1	104.9
GARDNER (Templeton Area)	Tanks	360.7	296.3	64.4	172.0	118.2	53.8	41.65	4.88	3.11	1.77	41.0	42.9	29.0	1.46	.75	10.7	44.0
Hopedale[2]	Tanks	287.5	249.5	38.0	138.0	107.5	30.5	36.13	3.90	2.64	1.26	36.3	35.3	26.0	1.08	.65	8.7	-
Hudson	Tanks	399.6	343.0	56.6	194.2	150.0	44.2	42.46	4.36	2.66	1.70	44.6	42.4	29.7	1.31	.72	9.8	45.9
Leicester[1]	None	320.6	228.3	92.3	171.3	98.3	73.0	35.63	5.25	3.47	1.78	25.0	39.4	23.5	.81	.25	13.5	-
Marion[4]	Tanks	186.0	170.0	16.0	80.4	70.4	10.0	12.26	1.48	.94	.54	27.7	19.6	14.0	.90	.43	3.7	-
MARLBOROUGH[1]	Tanks	521.3	425.0	96.3	277.3	195.0	82.3	47.10	7.25	5.40	1.85	51.0	56.2	35.9	1.43	.62	15.2	61.6
Maynard	Tank[3]	329.8	291.8	38.0	154.0	123.6	30.4	48.80	3.98	2.85	1.13	46.8	40.5	31.6	1.11	.61	9.8	-
Milford	Tanks	425.4	352.5	72.9	202.2	145.6	56.6	36.84	4.78	3.17	1.61	50.2	43.9	30.3	1.11	.59	10.0	-
Milford	Tank[3]	380.3	323.2	57.1	171.6	125.8	45.8	35.80	4.02	2.77	1.25	45.3	39.9	27.1	.81	.39	9.3	-
Natick	None	712.9	392.4	320.5	433.1	159.3	273.8	44.15	9.15	5.48	3.67	49.9	80.8	38.5	1.73	.45	17.6	103.1
North Attleborough[1]	Tanks	264.3	225.3	39.0	116.3	85.0	31.3	17.13	2.60	1.58	1.02	24.2	26.6	17.2	.84	.47	5.8	-
Northbridge	Tanks	203.5	164.4	39.1	103.8	73.5	30.3	23.82	2.79	1.89	.90	21.5	25.0	16.1	.86	.40	6.4	-
PITTSFIELD	Tank	394.2	318.7	75.5	196.8	133.8	63.0	26.96	4.17	2.73	1.44	33.0	42.6	29.0	1.27	.46	8.9	39.3
Southbridge[1]	Tanks	511.7	430.7	81.0	283.3	216.0	67.3	45.97	5.98	4.25	1.73	47.3	62.5	46.7	2.50	1.25	12.5	65.3
Spencer[1]	None	522.3	314.7	207.6	329.6	155.3	174.3	32.40	7.88	5.07	2.81	33.4	91.3	42.2	1.65	.47	15.8	72.2
Stockbridge[2]	None	318.8	265.6	53.2	165.2	120.0	45.2	18.96	2.47	1.69	.78	17.5	28.2	20.6	.68	.44	5.9	-
Westborough	None	847.0	372.8	474.2	529.0	183.7	345.3	42.93	13.26	6.27	6.99	41.1	97.1	42.6	2.37	.57	27.2	127.9
Winchendon[2]	Tanks	316.0	273.5	42.5	139.5	109.5	30.0	28.25	2.87	2.01	.86	39.3	32.0	24.4	1.93	1.14	6.8	-
WORCESTER[5]	Tanks[3]	557.0	474.0	83.0	150.0	93.0	57.0	28.10	3.60	1.84	1.76	83.8	43.0	26.5	21.30	2.15	8.0	27.5

[1] Six samples.
[2] Four samples.
[3] Imhoff.
[4] Five samples.
[5] Two samples.

TABLE NO. 3.—*Efficiency of Settling Tanks and Other Forms of Preliminary Treatment as Indicated by the Foregoing Tables.*

[Parts per Million]

CITY OR TOWN	Form of Preliminary Treatment	SUSPENDED SOLIDS			TOTAL ALBUMINOID AMMONIA			OXYGEN CONSUMED (UNFILTERED)			FATS[1]			CHLORINE	
		Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage
BROCKTON	Tanks	234.2	95.6	59	6.85	4.42	35	91.1	58.5	36	38.7	35.6	8	94.1	76.6
Clinton	Basins	316.9	34.9	89	7.92	2.95	63	67.7	24.4	64	91.1	23.6	74	45.5	36.7
Easthampton	Tanks	154.0	132.7	14	6.46	5.72	11	69.8	57.2	18	–	–	–	44.7	44.3
FITCHBURG	Tanks[2]	109.2	36.0	67	2.59	2.69	–	47.4	33.9	28	67.1	27.0	60	26.3	26.8
Framingham[3]	Tanks[2]	269.5	56.5	79	10.00	4.89	51	82.2	48.6	41	122.1	50.3	59	64.4	52.7
Franklin	Tanks	38.7	54.7	–	2.42	2.41	0	25.5	23.6	7	–	–	–	40.8	111.8
GARDNER (Templeton Area)	Tanks	215.5	64.4	70	11.59	4.88	58	87.0	42.9	51	107.0	44.0	59	58.0	41.0
Hopedale	Tanks	327.0	38.0	88	9.43	3.90	59	92.8	35.3	62	–	–	–	45.7	36.3
Hudson	Tanks	259.2	56.6	78	11.50	4.36	62	102.0	42.4	58	115.6	45.9	60	52.4	44.6
Marion	Tanks	190.0	16.0	92	1.92	1.48	23	28.5	19.6	31	–	–	–	26.0	27.7
MARLBOROUGH	Tanks	196.3	96.3	51	7.75	7.25	6	70.5	56.2	20	95.7	61.6	36	45.7	51.0
Maynard	Tank[2]	788.6	38.0	95	19.61	3.98	80	157.3	40.5	74	–	–	–	48.2	46.8
Milford	Tanks	607.4	72.9	88	7.64	4.78	37	76.2	43.9	42	–	–	–	50.4	50.2
Milford	Tank[2]	607.4	57.1	91	7.64	4.02	47	76.2	39.9	48	–	–	–	50.4	45.3
North Attleborough	Tanks	131.6	39.0	70	4.01	2.60	35	37.8	26.6	30	–	–	–	23.2	24.2
Northbridge	Tanks	145.3	39.1	73	6.34	2.79	56	58.7	25.0	57	–	–	–	34.7	21.5
PITTSFIELD	Tank	150.4	75.5	50	5.42	4.17	23	54.7	42.6	22	46.6	39.3	16	32.9	33.0
Southbridge	Tanks	235.4	81.0	66	10.28	5.98	42	87.3	62.5	28	107.7	65.3	39	47.2	47.3
Winchendon	Tanks	171.0	42.5	75	7.30	2.87	61	66.3	32.0	52	–	–	–	39.9	39.3
WORCESTER	Tanks[2]	320.0	83.0	74	5.85	3.60	38	81.0	43.0	47	69.5	27.5	60	97.3	83.8

[1] Fats determined in 57 per cent of samples.

[2] Imhoff.

[3] Comparatively small quantity of sewage from Saxonville not used in determining the efficiency of these tanks.

TABLE NO. 4 — *Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.*

[Parts per Million]

1. Brockton

	RESIDUE ON EVAPORATION						AMMONIA						NITROGEN AS —		OXYGEN CONSUMED				
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID											
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended	Chlorine	Nitrates	Nitrites	Unfiltered	Filtered	Kjeldahl Nitrogen	Fats	REMARKS
Settled sewage as applied to trickling filter.	471.6	376.0	95.6	215.6	135.6	80.0	41.24	4.42	2.16	2.26	76.6	–	–	58.5	34.1	10.5	35.6	Trickling filter has an area of 2.0 acres and a depth of 10 feet of stone from 1.5 to 3 inches in size.
Effluent from trickling filter.	455.8	373.8	82.0	184 0	127.0	57.0	11.05	2.64	.95	1.69	71.8	12.045	.189	37.1	15.5	6.1	15.2	One half of filter used alternately. The average rate of operation was about 1,329,000 gallons per acre per day.
Per cent removed .	3	1	14	15	6	29	73	40	56	25	–	–	–	37	55	42	57	
Settled effluent from trickling filter.	413.3	368.3	45.0	143.5	111.5	32.0	12.19	2.16	1.02	1.14	74.8	13.625	.248	31.4	15.4	5.3	9.9	
Per cent removed by secondary settling tank.	9	1	45	22	12	44	–	18	–	33	–	–	–	15	1	13	35	Period of sedimentation averaged about 1.58 hours.
Per cent removed by trickling filter and secondary settling tank.	12	2	53	33	18	60	70	51	53	50	–	–	–	46	55	50	72	Tanks cleaned 52 times.

TABLE NO. 4.—*Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.*—Continued.

[Parts per Million]

2. *Fitchburg*

	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	NITROGEN AS —		OXYGEN CONSUMED		Kjeldahl Nitrogen	Fats	REMARKS
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended		Nitrates	Nitrites	Unfiltered	Filtered			
Imhoff tank effluent as applied to trickling filter.	258.4	222.4	36.0	120.0	92.8	27.2	18.22	2.69	1.75	.94	26.8	–	–	33.9	20.4	6.1	27.0	Trickling filter has an area of 2.14 acres and a depth of 10 feet of stone from 1 to 3 inches in size.
Effluent from trickling filter.	240.8	214.0	26.8	102.8	82.4	20.4	4.60	1.35	.68	.67	27.7	11.100	.105	15.8	9.9	3.3	–	The average rate of operation was about 1,618,000 gallons per acre per day for area used (1.86 acres).
Per cent removed	7	4	26	14	11	25	75	50	61	29	–	–	–	53	51	4.6	–	
Settled effluent from trickling filter as discharged to Nashua River.	228.8	212.8	16.0	99.2	86.0	13.2	2.51	1.08	.58	.50	26.3	11.216	.098	13.4	9.2	2.6	–	
Per cent removed by secondary settling tanks.	5	1	40	4	–	35	45	20	15	25	–	–	–	15	7	21	–	Period of sedimentation about 7.1 hours.
Per cent removed by trickling filter and secondary settling tanks.	11	4	56	17	7	52	86	60	67	47	–	–	–	60	55	57	–	Tanks cleaned 4 times.

3. *Maynard*

Imhoff tank effluent as applied to trickling filter.	329.8	291.8	38.0	154.0	123.6	30.4	48.80	3.98	2.85	1.13	46.8	–	–	40.5	31.6	9.8	–	Trickling filter has an area of .25 of an acre and a depth of 7 feet of stone from 1½ to 2½ inches in size.
Effluent from trickling filter.	373.5	331.6	41.9	165.5	134.7	30.8	22.04	2.53	1.42	1.11	54.5	13.824	.123	25.2	16.5	5.5	–	The average rate of operation was about 336,000 gallons per acre per day.
Per cent removed	–	–	–	–	–	–	55	36	50	2	–	–	–	38	48	44	–	
Settled effluent from trickling filter as discharged to Assabet River.	396.3	379.9	16.4	170.7	160.2	10.5	23.29	1.86	1.48	.38	61.0	14.966	.295	19.9	17.0	4.2	–	
Per cent removed by secondary settling tank.	–	–	61	–	–	66	–	26	–	66	–	–	–	21	–	24	–	Period of sedimentation about 17 hours.
Per cent removed by trickling filter and secondary settling tank	–	–	57	–	–	65	52	53	48	66	–	–	–	51	46	57	–	Tanks cleaned 3 times.

4. *Milford*

Imhoff tank effluent as applied to trickling filter.	380.3	323.2	57.1	171.6	125.8	45.8	35.80	4.02	2.77	1.25	45.3	1.953	.104	39.9	27.1	9.3	–	Trickling filter has an area of .28 of an acre and a depth of 6 feet of stone from 1 to 1¾ inches in size.
Effluent from trickling filter.	342.0	304.7	37.3	135.1	107.8	27.3	12.87	1.79	.94	.85	45.3	12.244	.131	18.2	11.1	4.2	–	
Per cent removed.	10	6	35	21	14	40	64	55	66	32	–	–	–	54	59	55	–	
Settled effluent from trickling filter as discharged to Charles River.	341.6	312.0	29.6	135.3	111.6	23.7	13.89	1.71	.90	.81	45.5	9.833	.159	18.2	10.6	4.2	–	
Per cent removed by secondary settling tank.	–	–	21	–	–	13	–	4	4	5	–	–	–	0	5	0	–	
Per cent removed by trickling filter and secondary settling tank.	10	3	48	21	11	48	61	57	67	35	–	–	–	54	61	55	–	

TABLE NO. 4.—*Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.*—Concluded

[Parts per Million]

5. Worcester[1]

	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	NITROGEN AS —		OXYGEN CONSUMED		Kjeldahl Nitrogen	Fats	REMARKS
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended		Nitrates	Nitrites	Unfiltered	Filtered			
Imhoff tank effluent as applied to trickling filters.	557.0	474.0	83.0	150.0	93.0	57.0	28.10	3.60	1.84	1.76	83.8	–	–	43.0	26.5	8.0	27.5	Trickling filters have an area of 13.68 acres and a depth of 10 feet of stone from 1¼ to 3 inches in size.
Effluent from trickling filters	606.0	481.0	125.0	184.0	119.0	65.0	3.80	2.44	.70	1.74	90.8	11.535	.175	30.2	9.4	6.9	14.3	The average rate of operation was about 1,540,000 gallons per acre per day.
Per cent removed	–	–	–	–	–	–	86	32	62	1	–	–	–	30	65	14	48	
Settled effluent from trickling filters as discharged to Blackstone River.	520.0	457.0	63.0	137.0	104.0	33.0	4.00	.98	.47	.51	90.0	10.540	.125	17.2	9.00	3.1	5.5	
Per cent removed by secondary settling tanks.	14	5	50	26	13	49	–	60	33	71	–	–	–	43	4	55	62	Period of sedimentation averaged about 2.1 hours.
Per cent removed by trickling filters and secondary settling tanks	7	4	24	8	–	42	86	73	74	71	–	–	–	60	66	61	80	

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[1] Two samples.

TABLE NO. 5.—*Average Results of Analyses of Monthly Samples of Effluent from Sand Filters*

[Parts per Million]

CITY OR TOWN	Free Ammonia	Total Albuminoid Ammonia	Chlorine	NITROGEN AS — Nitrates	NITROGEN AS — Nitrites	Iron
ATTLEBORO[1]	14.96	1.313	30.9	6.825	.401	9.84
BROCKTON[2-3]	10.76	.769	87.2	10.964	.174	2.64
Clinton[3]	4.79	.223	33.0	4.646	.071	8.81
Concord[1]	.39	.214	21.4	9.925	.027	.16
Easthampton[1]	7.10	.456	30.9	8.580	.078	2.16
Framingham (new beds)[4]	16.57	.963	44.3	5.187	.183	6.20
Framingham (old beds)[3]	18.85	.912	42.7	3.567	.165	7.54
Franklin[1]	16.62	.885	199.2	8.803	.205	3.87
GARDNER (Gardner Area)[2]	21.30	1.743	47.3	6.240	.181	5.08
GARDNER (Templeton Area)[3]	27.49	1.074	42.7	2.638	.171	10.68
Hopedale[2-3]	11.22	.594	32.2	18.824	.010	.19
Hudson	21.52	1.166	39.1	2.742	.182	12.88
Leicester[1]	9.23	.680	25.3	5.515	.225	1.96
Marion[4]	.78	.158	27.8	5.812	.008	.78
MARLBOROUGH[3]	20.37	.644	40.7	3.709	.057	5.90
Milford	25.51	.799	49.5	1.340	.031	6.03
Natick	24.20	1.205	46.8	1.767	.115	5.25
North Attleborough[1]	5.01	.185	18.4	3.078	.090	2.77
Northbridge	3.86	.354	21.5	9.923	.078	.96
PITTSFIELD[3]	17.34	2.234	26.9	1.027	.083	2.25
Southbridge	24.53	.808	39.6	.241	.000	8.03
Spencer	9.60	.375	27.6	.270	.026	13.00
Stockbridge[2-3]	1.97	.362	18.1	4.967	.071	1.53
Westborough[3]	6.65	.641	49.0	5.590	.283	2.60
Winchendon[2]	3.73	.188	29.6	12.035	.040	.23

[1] Six samples.
[2] Four samples.
[3] Regular samples from two or more underdrains in one average.
[4] Five samples.

TABLE NO. 6.—*Efficiency of Sand Filters (Per Cent of Free and Albuminoid Ammonia Removed)*

[Parts per Million]

CITY OR TOWN	FREE AMMONIA			TOTAL ALBUMINOID AMMONIA			CHLORINE		Rate of Operation[1] with Even Distribution. (Gallons per Acre per Day)
	Applied Sewage	Effluent	Per Cent Removed	Applied Sewage	Effluent	Per Cent Removed	Applied Sewage	Effluent	
ATTLEBORO	31.37	14.96	52	4.58	1.313	71	31.9	30.9	44,000
BROCKTON	41.24	10.76	74	4.42	.769	83	76.6	87.2	
Clinton	22.00	4.79	78	2.95	.223	92	36.7	33.0	56,000
Concord	11.65	.39	97	1.77	.214	88	24.1	21.4	114,000
Easthampton	37.97	7.10	81	5.72	.456	92	44.3	30.9	
Framingham (new beds)[2]	40.82	16.57	59	4.89	.963	80	52.7	44.3	
Framingham (old beds)	32.50	18.85	42	8.65	.912	89	57.3	42.7	42,000
Franklin	22.23	16.62	25	2.41	.885	63	111.8	119.2	78,000
GARDNER (Gardner Area)	51.55	21.30	59	13.93	1.743	87	58.5	47.3	
GARDNER (Templeton Area)	41.65	27.49	29	4.88	1.074	78	41.0	42.7	
Hopedale	36.13	11.22	69	3.90	.594	85	36.3	32.2	49,000
Hudson	42.46	21.52	49	4.36	1.166	73	44.6	39.1	67,000
Leicester	35.63	9.23	74	5.25	.680	87	25.0	25.3	
Marion	12.26	.78	94	1.48	.158	89	27.7	27.8	102,000
MARLBOROUGH	47.10	20.37	57	7.25	.644	91	51.0	40.7	52,000
Milford	36.84	25.51	31	4.78	.799	83	50.2	49.5	47,000
Natick	44.15	24.20	45	9.15	1.205	87	49.9	46.8	70,000
North Attleborough	17.13	5.01	71	2.60	.185	93	24.2	18.4	100,000
Northbridge	23.82	3.86	84	2.79	.354	87	21.5	21.5	69,000
PITTSFIELD	26.96	17.34	36	4.17	2.234	46	33.0	26.9	109,000
Southbridge	45.97	24.53	47	5.98	.808	86	47.3	39.6	73,000
Spencer	32.40	9.60	70	7.88	.375	95	33.4	27.6	
Stockbridge	18.96	1.97	90	2.47	.362	85	17.5	18.1	
Westborough	42.93	6.65	85	13.26	.641	95	41.1	49.0	50,000
Winchendon	28.25	3.73	87	2.87	.188	93	39.3	29.6	

[1] See also Table No. 7.
[2] Beds constructed in 1924. Sewage passes through Imhoff tanks

TABLE NO. 7.—*Summary of Efficiency of Sewage Treatment Works. (Per Cent Removal from Raw Sewage to Final Effluent).*

[Parts per Million]

City or Town	Suspended Solids			Free Ammonia			Total Albuminoid Ammonia			Oxygen Consumed			Chlorine		Rate of Operation with Even Distribution. (Gallons per Acre per Day)
	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	
ATTLEBORO[1]	–	–	–	31.37	14.96	52	4.58	1.313	71	–	–	–	31.9	30.9	44,000
BROCKTON[2]	234.2	45.0	81	42.23	12.19	71	6.85	2.160	68	91.1	31.4	66	94.1	74.8	1,329,000
Clinton[3]	–	–	–	29.30	4.79	78	7.92	.223	92	–	–	–	45.5	33.0	56,000
Concord[1]	–	–	–	11.65	.39	97	1.77	.214	88	–	–	–	24.1	21.4	114,000
Easthampton[4]	–	–	–	37.77	7.10	81	6.46	.456	92	–	–	–	44.7	30.9	–
FITCHBURG[5]	109.2	16.0	85	17.70	2.51	86	2.59	1.080	58	47.4	13.4	72	26.3	26.3	1,618,000
Framingham (New Beds)[6]	–	–	–	35.98	16.57	54	10.00	.963	90	–	–	–	64.4	44.3	42,000
Framingham (Old Beds)[1]	–	–	–	32.50	18.85	42	8.65	.912	89	–	–	–	57.3	42.7	
Franklin[4]	–	–	–	26.20	16.62	25	2.42	.885	63	–	–	–	40.8	–	78,000
GARDNER (Gardner Area)[1]	–	–	–	51.55	21.30	59	13.93	1.743	87	–	–	–	58.5	47.3	–
GARDNER (Templeton Area)[4]	–	–	–	76.45	27.49	29	11.59	1.074	78	–	–	–	58.0	42.7	–
Hopedale[4]	–	–	–	50.55	11.22	69	9.43	.594	85	–	–	–	45.7	32.2	49,000
Hudson[4]	–	–	–	77.00	21.52	49	11.50	1.166	73	–	–	–	52.4	39.1	67,000
Leicester[1]	–	–	–	35.63	9.23	74	5.25	.680	87	–	–	–	25.0	25.3	–
Marion[4]	–	–	–	12.64	.78	94	1.92	.158	89	–	–	–	26.0	27.8	102,000
MARLBOROUGH[4]	–	–	–	47.23	20.37	57	7.75	.644	91	–	–	–	45.7	40.7	52,000
Maynard[5]	788.6	16.4	98	63.16	23.29	63	19.61	1.860	91	157.3	19.9	87	48.2	61.0	336,000
Milford[4]	–	–	–	38.20	25.51	31	7.64	.799	83	–	–	–	50.4	49.5	47,000
Milford[6]	607.4	29.6	95	38.20	13.89	64	7.64	1.710	78	76.2	18.2	76	50.4	45.5	–
Natick[1]	–	–	–	44.15	24.20	45	9.15	1.205	87	–	–	–	49.9	46.8	70,000
North Attleborough[4]	–	–	–	16.15	5.01	71	4.01	.185	93	–	–	–	23.2	18.4	100,000
Northbridge[4]	–	–	–	40.44	3.86	84	6.34	.354	87	–	–	–	34.7	21.5	69,000
PITTSFIELD[1]	–	–	–	29.06	17.34	36	5.42	2.234	46	–	–	–	32.9	26.9	109,000
Southbridge[4]	–	–	–	50.57	24.53	47	10.28	.808	86	–	–	–	47.2	39.6	73,000
Spencer[1]	–	–	–	32.40	9.60	70	7.88	.375	95	–	–	–	33.4	27.6	–
Stockbridge[1]	–	–	–	18.96	1.97	90	2.47	.362	85	–	–	–	17.5	18.1	–
Westborough[1]	–	–	–	42.93	6.65	85	13.26	.641	95	–	–	–	41.1	49.0	50,000
Winchendon[4]	–	–	–	36.15	3.73	87	7.30	.188	93	–	–	–	39.9	29.6	–
WORCESTER[5]	320.0	137.0	57	24.10	4.00	83	5.85	.980	83	81.0	17.2	79	97.3	90.0	–

[1] Sand filters.
[2] Settling tanks, trickling filters and secondary settling tanks.
[3] Basins and sand filters.
[4] Settling tanks and sand filters.
[5] Imhoff tanks, trickling filters and secondary settling tanks.
[6] Imhoff tanks and sand filters.

TABLE NO. 8.—*Extent of Sewerage Works, Rate of Flow, and Rate of Operation of Sand Filters*

City or Town	Population, Census of 1930	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	Estimated Quantity of Sewage Treated (Gallons per Day)			Estimated Quantity of Sewage per Connection	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Distribution. (Gallons per Acre per Day)
				Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow			
ATTLEBORO	21,769	37.30	1,828	679,000	1,490,000	337,000	371	15.50	44,000
BROCKTON	63,797	106.43	8,731	3,666,000[1]	5,699,000	2,488,000	420	–	–
Clinton	12,817	24.95	1,922	1,469,000[2]	2,555,000	1,439,000	764	26.23	56,000
Concord	7,477	17.46	738	626,000	1,188,000	366,000	848	5.48	114,000
Easthampton	11,323	24.43	1,254	–	–	–	–	2.20	–
FITCHBURG	40,692	66.61	–	3,010,000	4,460,000	2,020,000	–	–	–
Framingham	22,210	42.50	3,564	1,297,000	2,630,000	1,031,000	364	30.89	42,000
Franklin	7,028	14.49	851	253,000	430,000	110,000	297	3.24	78,000
GARDNER	19,399	36.14	2,519	–	–	–	–	16.50	–
Hopedale	2,973	7.08	370	184,000[3]	321,000	143,000	497	3.79	49,000
Hudson	8,469	14.69	1,149	600,000	1,087,000	392,000	522	9.00	67,000
Marion	1,638	4.14	220	196,000	402,000	96,000	891	1.93	102,000
MARLBOROUGH	15,587	36.81	2,650	1,041,000	2,211,000	596,000	393	20.19	52,000
Maynard	7,156	8.03	292	84,000	160,000	54,000	288	–	–
Milford	14,741	25.57	1,808	439,000[4]	696,000	270,000	–	9.30	47,000
Nantucket	3,678	21.00	1,610	916,000[5]	1,118,000	871,000	569	4.00	229,000
Natick	13,589	14.07	1,672	840,000	1,940,000	545,000	502	12.00	70,000
North Attleborough	10,197	17.99	1,038	880,000	1,048,000	665,000	848	8.75	100,000
Northbridge	9,713	15.93	976	822,000	960,000	682,000	842	12.00	69,000
PITTSFIELD	49,677	80.97	6,807	4,490,000[2]	4,800,000	1,770,000	660	41.15	109,000
Southbridge	14,264	–	–	911,000	1,084,000	763,000	–	12.50	73,000
Westborough	6,409	9.11	611	332,000	822,000	200,000	543	6.62	50,000
Winchendon	6,202	8.35	306	–	–	–	–	4.00	–
WORCESTER	195,311	241.05[6]	–	19,720,000	34,340,000	13,890,000	–	–	–

[1] Includes average of 2,657,000 gallons per day to trickling filter and 1,009,000 gallons to sand filters.

[2] Entire quantity of sewage not treated.

[3] New development not included in average.

[4] Records questionable. Amount to sand filters only.

[5] No underdrains. Filters drain direct to ocean.

[6] Includes 70.1 miles of combined sewers.

TABLE NO. 9—*General Features*

CITY OR TOWN	Year of Construction of and Additions to Works	Depth of Under-drains (Feet)	Distance Apart of Under-drains (Feet)	Filtering Material	Attention given to Disposal Works
ATTLEBORO	1912, 1913	4–7	35	Excellent sand and gravel; found in place	One man all the time; others when necessary.
BROCKTON	1893, 1905, 1908, 1912	5.5	30	Good sand and gravel; found in place; trickling filter.	One chemist in charge, foreman, day and night man; more when necessary.
Clinton	1898, 1899	8	60–70	Good sand and gravel; found in place	Two men all the time; others when necessary.
Concord	1899, 1928	none	–	Good sand underlaid with gravel; found in place	One man once a day.
Easthampton	1908	3.5	20–40	Good sand and gravel; largely found in place	One man all the time; others when necessary.
FITCHBURG	1914	–	–	Trickling filter—10 feet deep	Chemist in charge; 1 foreman, 1 day and 2 night men.
Framingham	1890, 1924	–	–	Good sand and gravel	One man all the time; others when necessary.
Franklin	1915	4.5	26	Good sand and gravel	Very little attention; one man once in a while.
GARDNER (Gardner Area)	1891	5	20	Good sand; handled in construction	One man all the time; others when necessary.
GARDNER (Templeton Area)	1901, 1909, 1931	3–4	20–30	Coarse sand; handled in construction	
Hopedale	1900, 1923	3	35–60	Good material—sand and gravel	One man all the time; others when necessary.
Hudson	1904, 1910	5–6	50–100	Good sand and gravel; found in place	One man all the time; others when necessary.
Leicester	1894, 1928	4	8	Mostly good sand; handled in construction	Very little attention.
Marion	1906, 1930	5	–	Mostly good sand; pockets of fine sand and some ledge; largely found in place	One man every day in summer, every other day in winter.
MARLBOROUGH	1891, 1908, 1909, 1910, 1911	4.5–6	30–50	Rather fine sand; found in place	One man all the time; others when necessary.
Maynard	1929	–	–	Trickling filter, 7 feet deep	One man all the time.
Milford	1907, 1924	5	40	Rather fine sand; found in place; trickling filter	One man every day; others when necessary.
Nantucket	1930	–	–	Good sand and gravel found in place	One man when necessary.
Natick	1896	6	36	Sand of good quality, but stratified; found in place	One man all the time; others when necessary.
North Attleborough	1909, 1910, 1931	5–6.5	55	Coarse sand and gravel; found in place	One man every day; others when necessary.
Northbridge	1906, 1907, 1920	4	50–75	Coarse sand and gravel; mostly handled	Two men all the time; others when necessary.
PITTSFIELD	1901, 1915	4	35	Good sand; mostly found in place	Two men all the time; others when necessary.
Southbridge	1908, 1925, 1926	4	40	Fair sand and gravel; considerable quantity handled, some found in place.	One man part of every day.
Spencer	1897, 1923	–[1]	–	Good sand and gravel; largely found in place	One man all the time; others when necessary.
Stockbridge	1899, 1921, 1922	3–4.5	23	Sand filters, good quality sand	One man all the time.
		3.4–5	30	Irrigation area, rather fine sand	
Westborough	1892, 1911	5	30–40	Good sand and gravel; handled in construction	One man all the time; others when necessary.
Winchendon	1928	–	–	Good sand and gravel; found in place	One man part time.
WORCESTER	1898[2,3], 1925	4–6	35–50	Trickling filters, sand area not in use	Chemist in charge; several men all the time.

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[1] Only three beds underdrained.

[2] Year of first construction of sand filters. Many additions

[3] Sedimentation tanks and sand beds abandoned June, 1925. Imhoff tanks, trickling filters and secondary tanks installed.

EXAMINATION OF SEWER OUTLETS DISCHARGING INTO THE SEA

No special examinations were made of the various main sewer outlets discharging into the sea during the year with the exception of the outlet at Brant Rock in the town of Marshfield and the outlet at Sagamore Hill and Hampton Head in Hull. The outlet at Brant Rock was extended a short distance during the year, and the time for the completion of this outlet was extended by the Department until December 15, 1934, while the time for the removal of the sewer outlet at Sagamore Hill and Hampton Head was extended by the Department until June 1, 1936.

INVESTIGATIONS RELATIVE TO SHELLFISH

Numerous applications and petitions have been received during the year relative to the removal of restrictions on the taking of shellfish from various areas along the sea coast, and as a result of investigations the restrictions were removed on a small portion of Boston Harbor in the vicinity of Weymouth, a portion of the Weir River in Hingham and Hull, a small area in the southerly part of Plymouth Harbor, and a part of the area to the east of Rocky Nook in Plymouth and Kingston.

Chapter 252 of the Acts of 1933 authorizes the taking of shellfish from Wollaston Beach without a permit from the Metropolitan District Commission when and if the restrictions on the taking of shellfish from this beach are removed by this Department. The restrictions on a portion of Wollaston Beach were removed by the Department in a communication dated November 15, 1933.

The municipal shellfish treatment plant at Newburyport has been operated throughout the year. The chlorinating plant of the Pioneer Fisheries Company at Plymouth was also in operation throughout most of the year, but the plant at Scituate was operated only during a short period in June and July. Daily analyses made by the local laboratories at these three plants which were checked up from time to time at the Department's laboratory show satisfactory results.

The Special Commission studying the shellfish law secured an entire change in this law which went into effect in October 1933. Under the new law the Department is still charged with the determination of the extent of contamination, but the certification of shellfish dealers is now handled by the Supervisor of Marine Fisheries. The Department continues its general supervision of shellfish chlorinating plants and in addition is charged with the enforcement of the law relative to the importation of shellfish from outside the State. During 1933 up to the time when the certification work was transferred from the Department, 122 shippers' certificates and 411 shellfish bed certificates were issued by the Department.

One other duty placed upon the Department by the new law is to determine the sources of pollution of contaminated areas from which shellfish are taken for treatment purposes and the proportion in which various cities and towns are responsible for such pollution. An investigation relative to the sources of pollution of Newburyport Harbor was being made at the end of the year.

SPECIAL INVESTIGATIONS

The Department has undertaken two special investigations during the past year as required by resolves of the Legislature. One of these investigations is in connection with the condition of Spot Pond Brook in Malden and Melrose as required under Chapter 15 of the Resolves of the year 1933. The other relates to the use of certain lands and waters in the Commonwealth for recreational purposes, as authorized under Chapter 10 of the Resolves of 1933. The Spot Pond Brook investigation was made jointly by the Department of Public Health and the Metropolitan District Commission, and that under Chapter 10 by the Commissioners of Conservation and Public Health and the Metropolitan District Commission. Reports as required under these resolves have been prepared and submitted to the Legislature.

WORK OF THE DIVISION IN CONNECTION WITH THE PUBLIC WORKS AND CIVIL WORKS ADMINISTRATION PROJECTS

The amount of work which the Engineering Division has been called upon to carry out in connection with the water supply and sewerage projects financed under the National Industrial Recovery Act, through the medium of the Public Works Administration and the Civil Works Administration, was so great that additional funds were appropriated to provide for the employment of engineers especially for this work. In this connection 45 projects on matters of water supply and sewerage have been submitted to the Department for approval before financing under the Public Works Administration, the Civil Works Administration and welfare appropriations. Many of these projects related to work at State institutions. The Department also formulated lists of necessary water and sewerage projects worthy of such financing, and upon completion of these lists the various municipalities were advised that the work called for should be undertaken at the earliest practicable time. In all cases this work had been recommended previously by the Department. As a result of the advice of the Department many municipalities have applied for loans and Civil Works Administration grants, and by the end of the year construction work had commenced in connection with the reconstruction of the filters for filtering the water supply of the city of Newburyport, filters to be used in connection with the water supply of the town of Braintree, improvements in the sewage disposal works in the city of Marlborough, and improvements in the sewage disposal works in the city of Pittsfield and the towns of Medfield and Franklin. Of the number of projects submitted for financing through the Public Works Administration, four projects approved in connection with the State institutions under the control of the Department of Public Health called for reconstruction of the sewage disposal works at the Westfield and Lakeville State sanatoria, separation of the storm water and sewage at the Rutland State Sanatorium, and boilers to be installed at the Rutland State Sanatorium. Plans were prepared for certain fire protection work at all of these institutions but funds were not provided. In addition, the advice of the Department has been given relative to plans for water supply, sewerage, and sewage disposal at other State institutions for financing under the Federal Public Works and Civil Works administrations. These include the sewage disposal works at the Bridgewater State Farm, the Tewksbury State Infirmary, the Monson State Hospital, and the Industrial School for Girls at Lancaster.

Examination of Camps and Roadside Stands

As a result of the many activities of the Engineering Division during the past year it has been impracticable to examine as many of the recreational camps and roadside stands as has been the practice in recent years. The need of such examinations is illustrated in the cases of typhoid fever found in the town of Rockport at a roadside stand. Reexaminations made by the Division have shown that the proprietors of some roadside stands have not followed the advice of the Department, but as a result of the recommendations of the Department to the local health authorities action by such authorities has been taken compelling the roadside stand owners to maintain a safe and satisfactory water supply in order to retain their victualler licenses.

Civilian Conservation Corps Camps

A large amount of time has been devoted to the selection of some thirty-four camps for occupancy by the Civilian Conservation Corps in this State. In addition to assisting in such selections, investigations were made for sources of water supply and suitable areas for the disposal of sewage, and after the establishment of the camps the sources of water supply and the works for the disposal of sewage have been examined by representatives of the Department. Frequent bacterial examinations have been made of the water supplies at these camps and the Department has advised the Corps Surgeon of the First Corps Area of the U. S. Army both in regard to the condition of the water supplies and works for the disposal of sewage. Only one of these camps is located on the watershed of a public water supply, that being in the city of Chicopee where a camp has been established near the northerly divide of the watershed of Cooley Brook Reservoir. Drainage conditions in this vicinity are such that no surface drainage from the camp can flow directly into any tributary of Cooley Brook. In cases where there is any likelihood of the Civilian Conservation Corps men working on a watershed of a public water supply, the Department has advised the board of water commissioners or other board having control of such supplies to adopt rules and regulations governing the disposal of sewage and other polluted matter from those working on such lands. The following table shows the locations of the Civilian Conservation Corps camps established in this State and the number of persons at these camps, also the sources of water supply. Sewage disposal is generally by means of latrines or cesspools.

U. S. No.	Location of Camp		Water Supply	
	City or Town	Reservation	Source	Treatment
2142	Andover	Harold Parker State Forest	Drilled Well	
4103	Andover	Harold Parker State Forest	Dug Well	
2154	Becket—Camps No. 1 and No. 2	October Mountain State Forest	Open Brook—Spring	Chlorinated
2164	Bourne—Camps No. 1 and No. 2	Shawme State Forest	Tubular Wells	
2147	Brimfield	Brimfield State Forest	Dug Well	
2162	Charlemont	Mohawk Trail State Forest	Springs	
2149	Chester	Chester—Blandford State Forest	Open Brook	Chlorinated
2199	Chicopee	Chicopee Water Supply—Reservation	Chicopee Water Supply	Filtered and Chlorinated
2165	Edgartown	Vineyard Haven State Forest	Tubular Wells	
2146	Erving	Erving State Forest	Open Stream	Chlorinated
2171	Fall River	Fall River Water Supply—Reservation	Fall River Water Supply	Chlorinated
2169	Foxborough	Foxborough State Forest	Foxborough Water Supply	
2148	Goshen	Conway & D.A.R. State Forest	Drilled Well	
2150	Granville	Granville State Forest	Springs and Dug Well	
2153	Great Barrington—Camps No. 1 and No. 2	Beartown State Forest	Springs and Open Brook	
2170	Milton	Metropolitan Parks District—Blue Hills Reservation	Metropolitan Water Supply—Milton	Chlorinated
2157	Monroe	Monroe State Forest	Open Brooks	
2151	Otis	Otis State Forest	Spring	
2155	Peru	Peru State Forest	Open Brook	Chlorinated
2159	Pittsfield	Pittsfield State Forest	Open Brook	
2163	Plymouth—Camps No. 1 and No. 2	Myles Standish State Forest	Tubular Wells	
2152	Sandisfield	Sandisfield State Forest	Spring	
2158	Savoy	Savoy Mt. State Forest	Spring	
2160	Spencer	Spencer—Oakham State Forest	Tubular Wells	
2161	Tolland	Tolland State Forest	Open Reservoir	Chlorinated
2145	Wendell	Wendell State Forest	Dug Well	
2143	Westminster	Leominster State Forest	Well and Open Brook	
2198	Williamstown	Mt. Greylock State Reservation	Open Brook	
2144	Winchendon	Otter River State Forest	Tubular Wells	
2156	Windsor	Windsor and Hawley State Forest	Spring and Open Stream	Chlorinated

Note: These camps are uniform in organization with provision for a total complement of men and supervisors of 225 at each camp.

EXAMINATION OF BATHING PLACES

During the summer of 1933 special studies were made in connection with four outdoor bathing places, viz., Crystal Lake in Newton; Frog Pond, Boston Common; Magazine Beach, Charles River; and Revere Beach. In carrying out this investigation certain factors affecting the bacterial content of the water were determined as far as practicable. These were:

1. Sewage and other pollution.
2. Influence of dilution, storms, etc.
3. Influence of sedimentation.
4. Chemical constituents of the water.
5. pH of water.
6. Bacteriophages in water.
7. Influence of number of bathers.
8. Influence of weather conditions.

All the field work, including the collection of samples, was under the direction of the Division of Sanitary Engineering, with the assistance of the Water and Sewage Laboratories and the Lawrence Experiment Station, while the question of the infection of bathers and the bacteriophage work were under the direction of Roy F. Feemster, M.D.

The study shows that in places like Crystal Lake in Newton, a natural lake free from sewage pollution, where the water is not chlorinated and where the beach is frequented at times by as many as 1,200 persons, there were no B. Coli in the 10 cubic centimeter portions of the water examined in 36 per cent of the samples collected. The maximum B. Coli content was 100 per 100 cubic centimeters, and the average was about 33 per 100 cubic centimeters. The Frog Pond on Boston Common, which is an open basin with a concrete bottom, receives an almost continuous flow of city water and is frequented by several hundred persons at a time during the warmer days of the year. The water contained no B. Coli in 10 per cent of the samples collected; the average number of B. Coli present was 490 per 100 cubic centimeters. The amount of clean water discharged into this pool was equal to the standard set up under the requirements of the committee of the American Public Health Association for swimming pools and other public bathing places. At Magazine Beach on the Charles River, where several thousand persons bathe, the bacterial load during the past summer varied from 100 to 55,000 B. Coli per 100 cubic centimeters, while the average during the period of the investigation was greater than 5,000 per 100 cubic centimeters. In this case the river above the beach is polluted at times during storms by the overflow of sewage. At Revere Beach, where there is no direct sewage pollution, no B. Coli were found in 50 per cent of the samples collected, but in the remainder of the samples the number of B. Coli present varied from 30 to 1,000 per 100 cubic centimeters. The average B. Coli content of the water of this beach was 134 per 100 cubic centimeters.

No bacterial examinations were made of samples of sediment collected at Revere Beach, but the bacterial examinations of sediment collected at the other bathing places showed a larger number of B. Coli in the sediment than in the water over these areas.

Examinations showed that at Crystal Lake, Magazine Beach and Revere Beach there were present bacteriophages Dysenteriae Shiga and Dysenteriae Sonne. In addition, there were present at Magazine Beach and Crystal Lake B. Coli communis, at Magazine Beach and Revere Beach B. paratyphosus and B. dysenteriae Hiss-Y, at Magazine Beach B. typhosus, and at Crystal Lake B. dysenteriae Flexner.

In carrying out the epidemiological studies a large number of families were visited where children bathed in the waters under investigation. These visitations were made by a person trained in epidemiological studies who left postcards at the homes with instructions that they be used in reporting any sickness occurring among those bathing at any of the beaches referred to. In addition, a number of physicians were requested to report any intestinal diseases among those patronizing the beaches. No diseases were reported either by the cards or the physicians.

WATER AND SEWAGE LABORATORIES AND LAWRENCE EXPERIMENT STATION

On September 15, 1933, on account of the Massachusetts retirement laws, Mr. H. W. Clark, Director and Chief Chemist of the Division of Water and Sewage Laboratories (which includes the Lawrence Experiment Station), terminated forty-five years of devoted and valuable service to this Department. Following his retirement, this Division was consolidated with the Division of Sanitary Engineering and the Director of that Division placed in charge.

Mr. Clark's years of service to this Department have resulted in scientific discoveries, many of which are the basis of modern methods of treating water and the disposal and purification of sewage, and his work in these two important branches of sanitary engineering has been the inspiration and shown the way for other workers in this field throughout the world.

It is, of course, impossible to give here a summary of the important work done by him and under his direction during these years but a few salient features may be mentioned: In water purification, for example, the first application of the B. coli test for determining the efficiency of water filters in the removal of disease germs was made by him at the Lawrence Experiment Station in 1897, and through all these years he has continued important studies on the efficiency of various types of filters and apparatus and also of storage for the purification of water supplies. The first elaborate studies on the important subject of the removal of microscopic organisms and their resultant disagreeable tastes and odors in water by aeration and filtration were made by him nearly thirty-five years ago, and in 1916 he began those interesting researches in regard to the removal of coloring matter from water by filtration through sand filters "loaded" or impregnated either with ferric or aluminum hydroxide instead of applying coagulants to the water to be filtered. With certain waters this method has been successful in experimental work but it has not as yet been used in actual practice. Mr. Clark's important work on the corrosion of metal and other types of service pipes was begun thirty-eight years ago when he published his first paper on this subject, and it culminated, perhaps, in 1927 when his last paper, entitled "The Effect of Pipes of Different Metals upon the Quality of Water Supplies," was presented to the New England Water Works Association and received the Dexter Brackett medal. In sewage purification, separate sludge digestion for the treatment of organic solids in order to avoid the objectionable features of septic tank disposal was originated by him, and separate sludge digestion tanks are now in use all over the world at municipal sewage disposal plants. His determination of the nature and volume of gases generated in digesting sludge was the beginning of the use of these gases for generating steam for power at sewage disposal plants and for their use at municipal gas plants. He also demonstrated that blowing air into sewage in contact with accumulated solids from previous treatment of sewage, causes clarification, oxidation, and a high degree of purification. This was the beginning of the so-called activated sludge process now so widely used at many large disposal plants both in this country and abroad. The design, construction and method of operation of sewage trickling filters such as those in use at Worcester, Fitchburg and Brockton in this State and at many large cities in this country and abroad, are largely due to his studies and results. In fact, his work on the important methods of sewage disposal mentioned here, has been the basis of design for many of the modern methods of sewage treatment practiced throughout the world. He was a pioneer in this country in the development of methods for the treatment of industrial wastes (so great a factor in river pollution) and more than fifty such disposal problems have been worked out under his direction.

The writings of Mr. Clark have appeared not only in the last thirty-eight annual reports of the Department but in scientific and technical journals, and more than seventy-five papers by him, or by him in collaboration with his assistants, have been published. His entire work has been of great value to the State, both in the improvement of water supplies and the sanitary condition of streams. He has had direction over a great volume of analytical work carried on in the State House and the Lawrence Experiment Station laboratories of his Division, and he has served on many important committees of the various technical societies of which he is a member.

WATER AND SEWAGE LABORATORIES

During the year 1933 the Water and Sewage Laboratories as usual carried on a large amount of analytical work necessitated by the general oversight of inland waters as called for by the General Laws.

Studies were made concerning the odors imparted to water by certain paints used on the interior of standpipes, and of the failure of certain lead-lined pipes in one of the towns of the State. Another interesting study was made in regard to the spoilage of surgical instruments used in one of the hospitals whereby these instruments became copper colored after sterilization. Investigation disclosed the fact that the sterilizer baskets had been sent away to be replated with nickel but instead had been hot tinned. When these baskets were placed in the sterilizer containing nickel-plated surgical instruments in the presence of a solution of sal soda used as a cleansing agent, an electro-chemical reaction took place whereby the nickel was dissolved from the instruments. The remedy advised was to replate with nickel the entire instrument sterilizer, including the baskets. It was again necessary during the year to determine the cause of certain sudden deaths, this time in the cabin of a yacht; and again it was proved that carbon monoxide was the cause.

The following table gives a summary of the analytical work carried on in the State House laboratories:

Water and Sewage Laboratories, State House

Samples from public water supplies:	
Surface waters	2,560
Ground waters	1,509
Samples from domestic wells, ice supplies, swimming pools	353
Samples from rivers	1,212
Samples from sewage disposal works:	
Sewages	731
Effluents	499
Samples of wastes and effluents from factories	20
Samples of sea water	43
Miscellaneous samples (partial analyses)	111
Special examinations of water (including field work) for manganese, lead, copper, zinc, residual alum, oil, alkalinity, fats, dissolved oxygen, carbonic acid, hydrogen ion	2,516
Mineral analyses and gas analyses	9
Microscopical examinations	2,830
Determination of lead in sample of cider (1); in tacks (3)	4
Determination of lime in suspended matter	1
Determination of odor imparted to Metropolitan water by standpipe paints	36
Examination of iron scale for mineral constituents	6

LAWRENCE EXPERIMENT STATION

Much work was done in the field by the staff of the Lawrence Experiment Station in connection with the condition of rivers, water supplies and sewage filtration areas. Considerable study was given to the condition of shellfish and shellfish areas, and a bacteriologist at the Station was in court twenty-two times to testify in shellfish prosecutions by the Department. Many reports were made in regard to sewage disposal, water purification, chlorine treatment, the condition of water supplies, swimming pools, bathing beaches, and the results of other field work of various kinds.

During the year, studies were continued on the disposal of wastes from two gas plants, particularly the ammonia-still waste, and sand and trickling filters were operated at the Experiment Station with such wastes. The results of this work showed that these ammonia-still residues, when mixed with sewage in the proper proportion, could be permitted to enter sewers without injury to municipal filtration plants; that is, good nitrification and purification of the sewage would not be impaired.

Further work was carried on in regard to the removal of caustic lime from the wastes of the Salem-Peabody industrial plants handling leather, felt and gelatin, as this type of waste forms a progressively thickening scale of calcium carbonate in the sewers. The work during the year on this subject was largely to learn how much caustic lime is removed from the wastes at the industrial plants where such wastes are carbonated with flue gas. The results showed the effectiveness of these carbonating devices and made clear that only occasionally does caustic lime reach the outfall sewer of the South Essex Sewerage District.

Research work on methods of sewage purification and water treatment was carried on at the Experiment Station and especial consideration was given to studies of the efficiency of trickling filters of different depths and in regard to the relative efficiency of aeration and chlorination as preliminary treatments before filtration. As slow sand filtration of sewage is an important method of disposal in Massachusetts and as properly constructed and operated filters of this type are very efficient, studies have been made at Lawrence for the past two years to demonstrate the results of intelligent and unintelligent operation of such filters. In connection with this work, seven filters are in operation at the Station, each one receiving an equal volume of sewage but in varying ways; that is, the first filter is flooded daily; the second, every second day, and so on. The seventh filter, which is flooded only every seventh day, receives on this day the same volume as the filter flooded daily receives in seven days. As is to be expected, the effluents from the first to the seventh filter, are progressively of poorer quality. Further work along this line, to show the varying efficiency of filters of different depths, has been started.

The important study begun four years ago in regard to the purification of the very polluted Merrimack River water by storage was continued throughout 1933. This river water passes through underground tanks, containing seven compartments, at such a rate that during the year it has received, theoretically, thirty days' storage. By this storage the number of B. coli has been reduced from 3,000 to 6 per 100 cubic centimeters, the results of course showing the great efficiency of purification by storage for a water even as polluted as that of the Merrimack River.

As has been the custom for the past forty years, the Experiment Station force has maintained a general oversight of the operation and the bacterial efficiency of the Lawrence city filters, both by inspection of the chlorine plant and by the almost daily bacterial examination of samples of the water. This has been necessary as during all these years the city has never employed a trained operator at the filters or established a laboratory there. In addition, all water and sewage bacterial work, including such work in connection with the general oversight of inland waters, has been done at the Lawrence Experiment Station.

The State House laboratories and the Experiment Station as usual have been visited during the year by many persons interested in water and sewage purification, analytical and other work, a number of whom were from foreign countries.

The analytical work carried on at the Station is summarized in the following table and a resumé of some of the research work is given on following pages:

Lawrence Experiment Station

Chemical examinations on account of investigations concerning the disposal of domestic sewage and factory wastes, filtration and other treatment of water supplies, swimming pools, and the investigation of the Merrimack and other rivers	2,457
Mechanical and chemical examinations of sands	266
Bacterial examinations of water supplies, rivers, sewages and filter effluents, ice, swimming pools, wastes	5,519
Bacterial examinations in connection with methods of purification of sewage and water	505
Bacterial examinations of shellfish and sea waters	1,311

Character of Coke used in the Removal of Iron from Ground Waters

Studies and experiments during the year determined that the coke used for filters in water treatment plants where the removal of iron and manganese is the chief object, should be hard; that is, the coke which produces a minimum amount of fine material during handling and use in such filters. There is comparatively little variation in the composition of coke from different places. It consists of approximately 80 per cent fixed carbon, from 4 to 5 per cent of compounds containing hydrogen, oxygen and nitrogen, a per cent or so of sulphur, and the remainder is ash. The greatest difference is in its physical structure, that is, hardness and porosity; and these depend largely on the temperature and the length of time that coal is heated in retorts and to a less extent on the kind of coal used. There are two general types of coke; one is made by a process in which the coke is the principal product and the other is made by a process in which the coke is a secondary product. An undesirable feature of some coke is the presence of small pieces of iron ore. When such coke is placed in water, this iron ore forms spots of rust and introduces ferric hydroxide to the water.

Shellfish

During the year 927 samples of shellfish and 384 samples of sea water were examined, 360 of the shellfish samples being examined for the Food and Drug Division, which necessitated twenty-two appearances in court in connection with prosecutions concerning polluted shellfish. It was found in further work with quahogs subjected to pollution near a sewer outfall that they became only slightly contaminated with B. coli as compared to soft-shell clams exposed to similar pollution. This was true in the shell-water test and also in the Fisher body test. Pollution of quahogs is as readily removed by chlorination as is pollution of soft-shell clams.

Tannery Wastes

Work was done in regard to improving the chemical precipitation of tannery wastes at two tanneries in Woburn. As these wastes are always high in organic matter, efficient chemical precipitation is difficult to obtain and about all that can be expected by such treatment is the clarification of the wastes with a small removal of soluble matter.

As during previous years, the determination of lime and the various forms of alkalinity in wastes from Salem and Peabody tanneries and allied industries required the examination of 424 samples. This study has been carried on as caustic lime from these plants has caused serious deposits of calcium carbonate in the sewers and especially in the outfall sewer in the harbor. As described in previous reports, a number of carbonating plants have been installed and where carefully operated have removed practically all the caustic lime from the industrial wastes before these wastes enter the sewers.

Waste from the Manufacture of Illuminating Gas

There are two general types of these wastes. One type consists of a watery liquid from the oil and tar separator with some oily tar which is readily removed by strainers of sand or sawdust; the other is the residue from the ammonia still and contains phenols, thiocyanates and various complex compounds.

As at the present time the price of ammonia is so low that in some plants its recovery results in a loss of money, it was desired to know what the effect on municipal filters would be of mixing this liquor with the domestic sewage reaching the filtration area. This liquor contained .96 per cent of solid matter in solution and .55 per cent of ammonia, and its volume was only about .25 per cent of the volume of the domestic sewage treated at this municipality. A small filter, No. 616, containing 3½ feet in depth of sand of an effective size of .25 millimeter was started at the Experiment Station March 7, 1932, and continued until December 4. It received Lawrence sewage mixed with .5 per cent of this waste, was operated at a rate of 50,000 gallons per acre daily and except for higher nitrification its effluent was not appreciably different from that of Filter No. 591 operated as a control with domestic sewage only.

During 1933 experiments were made with similar wastes from another gas plant. In this case the ammonia had been removed by distillation and the resulting waste, containing from .3 to 1 per cent of organic solid matter in solution was too strong to be treated by bacterial action and could not be treated successfully by any form of chemical precipitation. This waste was free from suspended matter and of a reddish-brown color which increased on exposure to the air, and even .5 per cent imparted a decided color to domestic sewage.

During 1933, the ammonia-still liquor only was used in the following experiments: Two small filters, containing 3½ feet in depth of sand of an effective size of .25 millimeter, were operated at a rate of 50,000 gallons per acre daily. The first, No. 591, was operated as a control with Lawrence sewage only and the second, No. 592, received Lawrence sewage to which .5 per cent of ammonia-still liquor had been added, this being twice the proportion of waste that would be mixed with the domestic sewage at the municipal treatment works if all the ammonia-still liquor from the gas plant in question were discharged into sewers at the city in question. During seven months of 1932, Filter No. 592 was operated with a mixture of all the wastes from the gas plant, and the results are given in the report of that year.

Two small trickling filters, containing 10 feet in depth of crushed stone, were also operated in connection with these wastes. The first, No. 614, was run as a control with Lawrence sewage alone, and the second, No. 615, received Lawrence sewage to which .5 per cent of ammonia-still liquor had been added. This amount of waste did not interfere with the operation of the filter. Its effluent was slightly higher in organic matter than the effluent from the control filter, but nitrification was also slightly better. The color of the effluent of the control filter was 43 while that of Filter No. 615 was 62 parts per million.

As at this municipal plant it is the practice to apply the settled trickling filter effluent to sand filters during the warmer months of the year, two small sand filters were started at the Experiment Station in October to refilter the settled effluents of these two trickling filters. From this short period of operation it seems likely that all the color in the trickling filter effluent due to the waste will be removed by sand filtration.

As the result of over two years' study, it is evident that discharge at a uniform rate of this waste to the sewers will have no ill effect on the operation of the filters.

Average Analyses

Settled Lawrence Sewage and Ammonia Liquor applied to Filter No. 616

(Parts per Million)

Color	AMMONIA			Chlorine	NITROGEN AS—		Oxygen Consumed
	Free	ALBUMINOID			Nitrates	Nitrites	
		Total	In Solution				
–	70.4	8.20	5.3	73	–	–	96.0
Effluent from Filter No. 616							
13	.27	.29	–	72	55.3	.054	72.0
Settled Lawrence Sewage applied to Filter No. 591							
–	45.0	5.50	2.9	75	–	–	31.5
Effluent from Filter No. 591							
16	.32	.29	–	72	39.7	.758	2.7
Settled Lawrence Sewage and Ammonia-Still Liquor Applied to Filter No. 592							
–	55.9	6.5	3.7	80	–	–	57.5
Effluent from Filter No. 592							
21	2.39	.38	–	78	47.6	.345	3.3
Settled Lawrence Sewage Applied to Trickling Filter No. 614							
–	33.0	5.8	3.9	65	–	–	39.3
Effluent from Trickling Filter No. 614							
43	6.85	1.28	.75	58	16.9	.401	7.8
Settled Lawrence Sewage and Ammonia-Still Liquor Applied to Trickling Filter No. 615							
–	39.0	6.2	4.1	66	–	–	54.3
Effluent from Trickling Filter No. 615							
62	9.31	1.24	.84	59	17.4	.601	9.6

CHARACTER OF THE SEWAGE USED FOR INVESTIGATIONS UPON SEWAGE PURIFICATION AT THE LAWRENCE EXPERIMENT STATION

The sewage for the various filters, pumped to the Experiment Station through about 1,850 feet of pipe, is a fairly strong domestic sewage free from trade wastes and the coarser suspended matter is excluded by a strainer on the end of the pipe in the sewer.

The following tables present the average analyses of sewage used during the year. "Regular sewage" is the sewage as pumped to the Station; "settled sewage" is the same sewage after passing through Imhoff Tank No. 545 and receiving a slight additional settling in a large tank used for supplying all the filters at the Station, except Nos. 1, 4 and 9A which receive the effluent of Imhoff Tank No. 545.

IMHOFF TANK

One Imhoff tank was operated during the year. It is of concrete, 20 feet deep, with a settling compartment 7 feet 4 inches long by 1 foot wide and with gas vents 1 foot square at each end. The bottom of the settling compartment has a slope of 45 degrees toward the center where there is a slot opening. The digestion compartment has a capacity of 357 gallons; the settling compartment, 715 gallons, giving a theoretical storage of about one and one-half hours during the seven to eight hours that the sewage is being pumped. Settleable solids were removed during the year at the rate of 483 pounds dry matter per million gallons of sewage. The digested sludge as drawn monthly was entirely inoffensive, black in color, contained an average of 3.6 per cent dry matter and had a pH of around 7.0. The average composition of the dry sludge was,—fats, 14.8 per cent; nitrogen, 4.21 per cent; loss on ignition, 65.0 per cent. One hundred and fifty-four pounds of dry matter were withdrawn and 538 pounds were added. This tank would undoubtedly digest a much larger amount of fresh solids if they were available. Judging from laboratory experiments, Lawrence sludge as collected at the Station is more readily digested and is less subject to acid conditions than sludges containing more vegetable matter, such as enter most large Imhoff installations.

Average Analyses

Regular Sewage

(Parts per Million)

AMMONIA			KJELDAHL NITROGEN		Chlorine	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter
Free	ALBUMINOID		Total	In Solution				
	Total	In Solution						
34.3	8.2	5.7	14.9	10.0	67	53.1	45	1,200,000
Sewage After Passing Through Imhoff Tank No. 545								
31.3	6.6	4.4	11.2	7.2	61	41.3	33	1,570,000
Settled Sewage								
30.5	5.5	3.7	9.5	6.4	60	33.8	30	1,300,000

Average Solids

Regular Sewage

(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
552	313	239	411	197	214	141	116	25
Sewage after Passing Through Imhoff Tank No. 545								
470	240	230	377	179	198	93	61	32
Settled Sewage								
435	216	219	357	156	201	78	60	18

DIGESTION OF SLUDGE WITH NITRIFIED EFFLUENT FROM A SEWAGE FILTER

For the past five years the sludge collected from a settling tank at the Station has been digested in Tank No. 483 with a well-nitrified effluent of a sand filter receiving sewage. This work is are petition of similar work done in 1913 to 1916, inclusive. The tank consists of three compartments, 20 inches in diameter and 6 feet deep but only two compartments are used at present. The effluent is applied continuously at the bottom of the first compartment and passes from the top to the bottom of the second and then overflows. Sludge is collected three times weekly, settled, and applied for three weeks to one compartment of Tank No. 483, hence the maximum storage is three weeks although part of the sludge receives much less than this. The storage period has been varied during the five years the tank has been operated,—from eighteen weeks at times, to three weeks during 1933. Three weeks have been sufficient to give an odorless sludge, but the longer periods resulted in a greater destruction of organic matter.

The digestion process is a combination of anaerobic and aerobic action. Some methane is formed from the anaerobic process and on the other hand much oxygen is absorbed from the nitrates of the filter effluent as it passes through the tank. The sludge before digestion contained 69 per cent organic matter, 3.89 per cent nitrogen, 20.6 per cent fats; and after digestion, 60 per cent organic matter, 3.82 per cent nitrogen and 9 per cent fats. The volume of effluent applied to Tank No. 483 averaged 12.7 gallons for each gallon of sludge containing about .89 per cent dry matter. The average nitrates in the applied filter effluent was 27.5 parts per million and in the effluent of the tank, 8.3 parts per million. The addition of nitrates to the digesting sludge, besides furnishing available oxygen, supplies alkalinity to correct any acid tendencies, according to the reaction,—

$$2\,\mathrm{NaNO_3} + \mathrm{H_2O} = 2\,\mathrm{NaOH} + 5\,\mathrm{O} + 2\,\mathrm{N}$$

The caustic soda immediately combines with free carbon dioxide which is formed by the action of the oxygen on the carbonaceous matter of the sludge. The effluent of the tank is less likely to promote growths of microörganisms than the effluent entering the tank as it has a much smaller nitrate content.

Average Analyses

Effluent from Sand Filter applied to Sludge Digestion Tank No. 483

(Parts per Million)

UNFILTERED			FILTERED			AMMONIA			NITROGEN AS—	
						Free	ALBUMINOID			
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed		Total	In Solution	Nitrates	Nitrites
-	-	-	-	-	-	2.54	.63	.53	27.5	.113
Effluent from Sludge Digestion Tank No. 483										
363	140	223	339	122	217	13.7	1.11	.78	8.3	.368

OPERATION OF HOUSEHOLD SEPTIC TANKS

Two small septic tanks of concrete construction, Nos. 507 and 508, have been operated at the Station since June, 1920. The first is 4 feet long, 2 feet wide and 40 inches deep, with a sloping bottom and a capacity of 185 gallons; the second contains two compartments of the same size as the first and has a capacity of 370 gallons. Sewage enters each tank through trapped inlets and discharges through a pipe reaching 15 inches below the surface of the sewage in the tank. A baffle is placed one-third of the distance from the inlet to the outlet and reaches to within 8 inches of the bottom of the tank. The first tank receives practically fresh household sewage and the second, Lawrence sewage, a comparatively stale sewage. Both tanks are so operated that theoretically the sewage is held within each for two days; that is, the sewage added daily is equal to one-half the capacity of the tanks, disregarding the effect of the accumulated sludge. During a large part of the period of operation, the effluents from both tanks have been remarkably clear and comparatively odorless. Besides settling out suspended solids, these tanks have effected a considerable reduction of soluble albuminoid ammonia and oxygen consumed. The tanks were not opened in 1933 for sludge measurements.

Average Analyses

Fresh Sewage applied to Closed Septic Tank No. 507

(Parts per Million)

Ammonia			Kjeldahl Nitrogen		Chlorine	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter
Free	Albuminoid							
	Total	In Solution	Total	In Solution				
97.5	19.5	10.4	31.7	18.2	89	99.0	108	6,200,000
Effluent from Closed Septic Tank No. 507								
92.3	6.5	4.4	11.3	7.9	80	40.9	30	1,550,000
Regular Sewage applied to Closed Septic Tank No. 508								
44.8	9.9	6.4	16.9	11.3	69	59.9	45	2,600,000
Effluent from Closed Septic Tank No. 508								
46.5	3.4	2.2	6.0	3.7	67	21.8	19	2,000,000

Average Solids

Fresh Sewage applied to Closed Septic Tank No. 507

(Parts per Million)

Unfiltered			Filtered			In Suspension		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
855	559	296	460	245	215	395	314	81
Effluent from Closed Septic Tank No. 507								
466	204	262	399	162	237	67	42	25
Regular Sewage applied to Closed Septic Tank No. 508								
577	310	267	424	195	229	153	115	38
Effluent from Closed Septic Tank No. 508								
372	144	228	319	110	209	53	34	19

Activated Sludge

Tank No. 485 operated with Compressed Air.—Tank No. 590 by Agitation

Experiments on the aeration of sewage have been carried on at the Lawrence Experiment Station continuously since 1911, and descriptions and results of this work have been published in the annual reports of the Department. Activated sludge Tank No. 485, started in 1917, is still in operation and consists of three compartments 75 inches deep, each holding 230 gallons. The overflow from the last one, comprising the purified sewage and considerable sludge, passes through two settling tanks with capacities of 600 and 160 gallons, respectively, allowing about five and one-half hours' sedimentation during which the activated sludge settles out and is then pumped back to the first compartment. Air is applied at the bottom of each compartment through a filtros plate clamped to the top of an iron box at a rate approximating .33 cubic feet of air per hour per gallon of sewage. The tank is operated at the rate of 7,433,000 gallons per acre daily on the basis of the aerating and settling tanks, or 13,150,000 gallons on the basis of the activating tanks alone. It has been the custom to retain about 20 per cent by volume of sludge in the tank, the excess being pumped to waste from time to time.

In all the various aeration tanks at the Experiment Station until 1931, aeration had been obtained by compressed air but at a number of places in this country and abroad, aeration by mechanical means has been carried on successfully. There is yet no agreement as to which method is more efficient and economical. In 1931 a small tank was put in operation at the Station to study mechanical aeration. This tank, No. 590, is of concrete, of an effective depth of 7 feet 9 inches and is 3 feet by 4 feet at the top, but one side slopes at such an angle 15 inches from the top that the tank is only 4 feet by 6 inches at the bottom. Built on one side of the tank at the top is a circular compartment or trough of 6-inch radius, in which a close-fitting paddle revolves at 60 revolutions a minute. A slot, 2 inches wide and 4 feet long, is built in the side of the tank and connects the bottom of the tank with the bottom of the trough. When the paddle is revolved, the sewage in the trough is thrown over a low dividing wall into the main tank and is well distributed over its surface. As the liquid is thrown from the trough, more comes up from the bottom of the tank through the slot and circulation of the mixture of sewage and sludge is continuous. Tank No. 590 is operated at the same rate as Tank No. 485 and has a similar arrangement of settling tanks and sludge return. The settled effluent of each has contained an average of 6.4 parts per million of dissolved oxygen and has been similar in appearance, clear and bright, with a very small amount of suspended matter. Chemical analyses of their effluents are also similar except less nitrification is obtained in Tank No. 590. The settling tank for the overflow from Tank No. 590 was originally flat-bottomed and some trouble was experienced in drawing off all of the sludge. Some of the remaining sludge became septic and had an inhibitory effect on nitrification. This tank has been replaced by one with a conical bottom, with a resulting improvement in nitrification. No reliable power costs can be obtained from such small-scale experiments.

Average Analyses
Sewage applied to Activated Sludge Tank No. 485 and Mechanically Aerated Activated Sludge Tank No. 590
(Parts per Million)

APPEARANCE		AMMONIA			KJELDAHL NITROGEN			NITROGEN AS—			
			ALBUMINOID								
Turbidity	Color	Free	Total	In Solution	Total	In Solution	Chlorine	Nitrates	Nitrites	Oxygen Consumed	Bacteria per Cubic Centimeter
–	–	34.0	5.9	4.0	10.3	6.9	63	–	–	36.0	1,300,000
Effluent from Activated Sludge Tank No. 485											
2	40	13.4	1.3	1.0	2.4	1.7	56	12.2	.629	12.0	188,000
Effluent from Mechanically Aerated Activated Sludge Tank No. 590											
3	38	12.3	1.2	0.9	2.2	1.6	55	10.3	.400	10.7	1,150,000

Average Solids
Sewage applied to Activated Sludge Tank No. 485 and Mechanically Aerated Activated Sludge Tank No. 590
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
442	219	223	357	161	196	85	58	27
Effluent from Activated Sludge Tank No. 485								
358	121	237	339	110	229	19	11	8
Effluent from Mechanically Aerated Activated Sludge Tank No. 590								
353	102	251	336	94	242	17	8	9

TRICKLING FILTERS

Trickling filters have been operated at the Experiment Station since 1890 in studies of rates of operation, depth, size and kind of material, and various other phases of the operation of this type of filter.

For the past two years, a study has been made of the relative efficiency of partial chlorination and of aeration as a preliminary treatment of the applied sewage. The proportion of the total purification taking place at different depths has been determined also. Three filters, Nos. 571, 572, and 573 are identical in construction, being 1/20,000 of an acre in area and containing 10 feet in depth of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. Their average rate of operation during 1933 was 1,343,000 gallons per acre daily. At depths of 4, 6, and 8 feet, half-round sections of ¾-inch iron pipe are inserted to the center of the filters to collect small portions of the liquid passing through the filter. Filter No. 571 was operated as a control; No. 572 received sewage to which 10 parts per million of chlorine as calcium hypochlorite had been added at least one hour before being applied to the filter. Frequent tests showed that free chlorine had always disappeared in this time. This sewage was never sterile, although the number of bacteria was considerably reduced. The sewage applied to Filter No. 573 was aerated, the average dissolved oxygen being 6.1 parts per million at the time of application.

The results of two years' operation indicate that pre-chlorination, as used in this experiment, is of little or no value in improving the effluent of the filter. The final effluent of Filter No. 571, the control, is of slightly better quality and the effluent of Filter No. 573, receiving sewage with 6.1 parts per million of dissolved oxygen is considerably better than either of the other two. In fact, the effluent from the 8-foot outlet is fully as good as the effluent from the 10-foot outlet of the other two. This substantiates the statement in the last report to the effect that preliminary aeration of the applied sewage is equivalent to adding to the depth of the filter. The figures showing the purification taking place at different depths indicate that even at the lower depths purification is still going on and that presumably purification would continue if the depth of material were greater than 10 feet. The rate of change tends to decrease from the top of the filter downward because the least stable compounds are acted upon first near the top, and naturally, the remaining more stable ones are acted upon more slowly as they pass down through the filter.

A fourth filter, No. 578, of the same depth and construction as Filters Nos. 571 to 573, inclusive, received sewage from the first compartment of activated sludge Tank No. 485 which had been aerated about one hour and forty minutes and then settled. The average rate was 5,770,000 gallons per acre daily, compared with the rate of 1,343,000 gallons per acre daily of Filters Nos. 571, 572, and 573. In spite of the rate being over four times higher, the effluent of Filter No. 578 was of better quality, being lower in free and albuminoid ammonia, oxygen consumed, and suspended solids. Nitrification was somewhat lower but the effluent was perfectly stable.

Eight other trickling filters were operated during the year. The oldest, No. 135, is constructed of 10 feet in depth of walnut-size crushed stone, and has been in operation thirty-four years. Filters Nos. 452 to 455, inclusive, contain 4, 6, 8, and 10 feet in depth, respectively, of crushed stone that will pass a 1½-inch screen, and be retained by a ¾-inch screen. Filters Nos. 473 to 475, inclusive, contain 6, 8 and 10 feet in depth, respectively, of coarser stone, passing a 2½-inch screen and retained by a 1½-inch screen. The results of operation of these filters show the greater efficiency per foot of material of the deeper filters. The effluents of Filters Nos. 452, 453, 454, and 455 are of approximately the same quality, yet rates per foot in depth of stone are 178,000, 219,000, 319,000 and 375,000 gallons per acre daily for these filters of different depths. In addition, the deeper filter has a reserve capacity to handle temporary increases in strength or volume of sewage that the shallower filter lacks.

The following table shows the amount of nitrification for each foot of material between the various outlets.

(Parts per Million)

DEPTH	NITROGEN AS NITRATES PER FOOT OF FILTER DEPTH		
	Filter No. 571	Filter No. 572	Filter No 573
Surface to 4 feet	3.75	3.45	5.35
4 feet to 6 feet	2.60	2.50	2.20
6 feet to 8 feet	2.85	2.25	3.65
8 feet to 10 feet	2.00	1.75	1.55

This second table shows the decrease in soluble albuminoid ammonia, also a measure of purification, at the same depths.

(Parts per Million)

DEPTH	REMOVAL OF SOLUBLE ALBUMINOID AMMONIA BY THE FILTERING MATERIAL AT DIFFERENT DEPTHS		
	Filter No. 571	Filter No. 572	Filter No 573
Surface to 4 feet	.45	.45	.70
4 feet to 6 feet	.30	.15	.20
6 feet to 8 feet	.15	.15	.15
8 feet to 10 feet	.15	.15	.10

Average Analyses

Effluents from Trickling Filters Nos. 135, 452, 453, 454, 455, 473, 474 and 475

(Parts per Million)

FILTER NUMBER	Quantity Applied — Gallons per Acre Daily	AMMONIA			Kjeldahl Nitrogen	Chlorine	NITROGEN AS —		OXYGEN Consumed	Bacteria per Cubic Centimeter
		Free	ALBUMINOID Total	ALBUMINOID In Solution			Nitrates	Nitrites		
135	1,396,000	10.1	3.0	1.4	5.3	63	21.0	.425	19.9	174,000
452	713,000	16.6	3.7	2.2	6.5	62	12.7	.325	23.7	253,000
453	1,317,000	21.8	3.0	1.9	5.1	62	10.0	.575	17.9	173,000
454	2,556,000	13.9	3.0	1.5	5.3	62	13.4	.325	19.1	215,000
455	3,752,000	13.3	2.8	1.5	4.8	60	15.1	.313	20.7	210,000
473	503,000	14.1	3.2	1.9	5.8	62	14.5	.250	23.3	120,000
474	1,304,000	20.1	3.2	2.1	5.4	61	8.6	.438	18.9	220,000
475	2,673,000	16.1	3.7	2.0	6.4	60	13.1	.525	22.3	502,000

Average Solids

Effluents from Trickling Filters Nos. 135, 452, 453, 454, 455, 473, 474, 475, 571, 572 and 573.

(Parts per Million)

FILTER NUMBER	UNFILTERED			FILTERED			IN SUSPENSION		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
135	475	224	251	389	178	211	86	46	40
452	495	222	273	407	170	237	88	52	36
453	403	169	234	360	144	216	43	25	18
454	439	193	246	370	157	213	69	36	33
455	433	195	238	361	154	207	72	41	31
473	471	224	247	389	170	219	82	54	28
474	392	170	222	334	137	197	58	33	25
475	455	207	248	373	152	221	82	55	27
571*	528	233	295	427	175	252	101	58	43
572*	563	240	323	433	172	261	130	68	62
573*	513	241	272	415	188	227	98	53	45

*10-foot effluent.

Average Analyses

Effluents from Trickling Filters No. 571, 572 and 573 collected at Different Depths

Filter No. 571

(Parts per Million)

Depth (Feet)	AMMONIA			Kjeldahl Nitrogen	Chlorine	NITROGEN AS —		Oxygen consumed	Bacteria per Cubic Centimeter
	Free	ALBUMINOID Total	ALBUMINOID In Solution			Nitrates	Nitrites		
4	26.4	4.2	2.8	8.1	65	7.5	.351	30.5	310,000
6	19.5	3.9	2.2	7.2	64	12.7	.300	26.7	270,000
8	22.0	3.7	1.9	6.2	65	18.4	.235	24.3	250,000
10	14.8	3.3	1.6	6.1	63	22.4	.195	22.7	190,000
Filter No. 572									
4	25.4	4.4	2.8	8.2	82	6.9	.235	30.0	165,000*
6	21.4	4.5	2.5	8.4	84	11.9	.246	31.0	200,000
8	18.5	4.6	2.2	8.5	80	16.4	.230	28.2	210,000
10	16.7	4.0	1.9	7.9	79	19.9	.189	27.3	245,000
Filter No. 573									
4	18.4	4.0	2.3	7.3	62	10.7	.300	27.3	460,000
6	14.5	3.7	1.9	6.6	62	15.1	.250	27.6	230,000
8	11.0	3.2	1.6	6.0	61	22.4	.144	22.5	230,000
10	10.0	3.1	1.4	5.6	60	25.5	.150	23.6	100,000

*Bacteria per cubic centimeter in the chlorinated sewage applied to Filter No. 572 averaged 117,000.

Average Analyses
Sewage applied to and Effluent from Trickling Filter No. 578
(Parts per Million)

	AMMONIA			KJELDAHL NITROGEN			NITROGEN AS—			
		ALBUMINOID								
	Free	Total	In Solution	Total	In Solution	Chlorine	Nitrates	Nitrites	Oxygen Consumed	Bacteria per Cubic Centimeter
Applied, . . .	20.5	2.0	1.3	3.3	2.4	60	6.2	.751	13.3	606,000
Effluent, . . .	9.3	1.8	1.0	3.3	–	61	18.8	.188	13.3	248,000

Average Solids
Sewage applied to and Effluent from Trickling Filter No. 578
(Parts per Million)

	UNFILTERED			FILTERED			IN SUSPENSION		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Applied . .	336	115	221	307	96	211	29	19	10
Effluent . .	396	164	232	352	139	213	44	25	19

OPERATION OF CONTACT FILTERS

Only one contact filter, No. 175, is now in operation as a study of the permanency of this type of filter and as an example of this method of sewage purification. It was put in operation in 1901, is 1/20,000 of an acre in area and contains 39 inches in depth of coke passing a 1-inch screen and retained on a ¼-inch screen. During 1933 the filter was operated one five-hour cycle daily with sewage which had passed through an Imhoff tank and received a small amount of settling in a storage supply tank. It was allowed to rest one week six times during the year. Since 1901 it has been necessary to remove and wash the filtering material three times,—in 1911, in 1920, and late in 1933. At the end of 1932, the open space had decreased 29 per cent. In 1933 the decrease was much greater, being 49 per cent before removing and washing the material.

Average Analyses
Effluent from Contact Filter No. 175
(Parts per Million)

QUANTITY APPLIED	AMMONIA					NITROGEN AS—			
		ALBUMINOID							
Gallons per Acre Daily	Free	Total	In Solution	Kjeldahl Nitrogen	Chlorine	Nitrates	Nitrites	Oxygen Consumed	Bacteria per Cubic Centimeter
242,000	5.5	2.2	1.4	3.9	62	9.7	.288	14.0	377,000

Average Solids
Effluent from Contact Filter No. 175
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
374	140	234	349	130	219	25	10	15

INTERMITTENT SAND FILTERS

The first intermittent filter at the Experiment Station was started in 1887. Since then, 199 filters of this type have been operated with sewage, besides many with various kinds of trade wastes. In this early work, the intermittent sand filter was studied intensively and its basic principles thoroughly determined. It may be of interest at the present time to restate some of these basic principles as they have been neglected in the operation of many municipal filter plants.

The presence of air in the sand is vital to successful operation. This means that the surface of the filter should not be covered with sewage for any considerable length of time, not more than a few hours at the most. When sewage is applied to a filter, the air in the sand is displaced and as the sewage passes down through the filter, more air is drawn in. The air that is displaced has lost part of its oxygen through action of the bacteria on organic matter and in the production of nitrates.

The sand should be neither too fine nor too coarse. If too fine, the lower one to three feet of sand may remain saturated with water, preventing the entrance of air; if too coarse, the sewage will pass too rapidly for proper purification. Stratification of the sand is undesirable, causing clogging where the layers of fine and coarser sand meet. A layer of fine sand by remaining saturated with water may act as a water seal preventing passage of air.

In the early work it was so obvious that the proper method was to dose the filter in one application every day that little attention was paid to the results that would be obtained from less frequent applications of larger doses. It is unfortunately the practice, for a number of reasons, at many of the municipal and institution filtration areas to apply an amount of sewage equivalent to what should be many days' doses to a filter in one application during a few hours. This, of course, excludes air and changes an oxidizing process to a reducing one. A certain amount of purification results but it causes the filter to become clogged much more rapidly than if the filter were operated properly. When the filter is covered with sewage for a number of days, growths of green algae frequently take place, increasing the clogging condition.

Studies of Overdosing

To show the effect of this improper method of flooding filters, a series of seven small sand filters has been started at the Experiment Station. They are 10 inches in diameter and contain 4 feet in depth of sand of an effective size of .25 millimeter. The average rate of each filter is 75,000 gallons per acre daily and a well-settled sewage is applied. Filter No. 593 is run as a control and flooded once daily; Filter No. 594 is flooded every two days; Filter No. 595, every three days; Filter No. 596, every four days; Filter No. 597, every five days; Filter No. 598, every six days; and Filter No. 599, every seven days; but each filter receives an equal volume of sewage per week. Filter No. 600 is a duplicate of No. 593, except that 25 per cent of the filter material consists of stone between 1 and 2 inches in diameter. This material resembles unscreened sand such as used in some filters, and it is hoped to determine whether it is necessary or advisable to screen such sand before use.

The surfaces of these filters have been raked about once a week, but no material has been removed. This raking was necessary to prevent some of the less frequently flooded filters from remaining covered continuously with sewage. In this part of the study it was desired to have all the filters handle the same average volume of sewage. Later, all the filters will receive only the treatment that Filter No. 593 requires, and the effect of different times of flooding will show in the rates as well as the quality of the effluents.

An inspection of the analyses shows, with two exceptions, an increase in free and albuminoid ammonia, oxygen consumed, and in the number of B. coli and other bacteria in the effluents from Filters Nos. 593 to 599, inclusive; that is, the effluents are progressively poorer in quality as the intervals between floodings are increased. The appearance of the effluents follows the same course. The decrease of bacterial efficiency might prove to be hazardous where filters are being operated to help protect a water supply below the sewage works. The effluent from Filter No. 593 is clear and sparkling while the effluent from Filter No. 599 is very turbid. So far, nitrification has not been affected to the same degree as the other determinations just mentioned.

In the next period of this study, when frequent raking is discontinued, conditions will more nearly equal those in the overdosed filters of some of the municipal areas. It is expected that at that time the rates of the last filters of the series will materially decrease and the quality of their effluent will deteriorate. It will probably be shown also that much more sewage can be treated if filters are flooded daily than if they are flooded with larger amounts of sewage at longer intervals.

Late in the year a series of four similar filters, 2, 3, 4, and 5 feet in depth, respectively, was started to show the comparative effect of different depths of sand in filters. These filters have not been operated long enough to give results worth recording.

Filters Nos. 1, 4, and 9A

Filters Nos. 1, 4, and 9A are each 1/200 of an acre in area, and at the end of 1933, Filter No. 1 and Filter No. 4 had been operated forty-six years and Filter No. 9A, forty-three years. For the past eight years, the sewage applied to them has passed through an Imhoff tank where some suspended solids have been removed. These three filters contain 5 feet in depth of sand of an effective size of .48, .04, and .17 millimeter, respectively, and during the year were operated at average rates of 46,000, 18,800, and 45,800 gallons per acre daily, respectively. The surfaces of Filters Nos. 1 and 9A are trenched and ridged late in the fall, while the surface of Filter No. 4 is permanently arranged in circular trenches 14 inches wide, filled to a depth of 12 inches with coarse sand of an effective size of .48 millimeter. Sewage is applied to the trenches while grass is allowed to grow on the rest of the filter.

The lime applied to these filters in 1932 apparently had some effect in reducing the acidity of the effluents during 1933.

Average Analyses

Effluent from Filter No. 1, 4 and 9A

(Parts per Million)

Filter Number	Temperature (Degrees F.)		Ammonia		Chlorine	Nitrogen as —		Oxygen Consumed	Alkalinity	Bacteria per Cubic Centimeter
	Applied	Effluent	Free	Albuminoid		Nitrates	Nitrites			
1	54	52	4.52	.88	54	28.1	.035	6.7	6	63,000
4	54	51	.13	.22	50	26.0	.010	3.1	−7	1,070
9A	54	53	1.25	.37	45	25.1	.008	4.6	7	9,900

Average Analyses

Effluents from Filters Nos. 593, 594, 595, 596, 597, 598, 599 and 600

(Parts per Million)

Filter Number	Color	Number of Days Between Flooding	Ammonia		Chlorine	Nitrogen as —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
593	12	1	.38	.26	56	35.3	.024	2.2
594	12	2	.46	.40	58	29.8	.095	2.7
595	19	3	.93	.61	58	29.9	.377	3.3
596	21	4	.67	.72	57	30.2	.332	4.4
597	29	5	1.02	1.05	56	26.1	.993	6.5
598	28	6	1.27	1.07	58	24.5	.695	6.2
599	33	7	1.82	1.11	53	18.4	.939	6.6
600	13	1	.24	.26	53	27.1	.024	2.1

Average Bacterial Analyses

Effluent from— Filter Number	Bacteria per Cubic Centimeter			B. Coli in 100 cc.
	4 Days 20°C	24 Hrs.—37°C. Total	Red	
593	6,900	87	14	3
594	7,500	430	230	78
595	11.500	1,290	1,180	530
596	27,300	7,950	5,800	530
597	97,200	25,300	18,300	3,300
598	142,000	9,100	6,600	3,300
599	151,000	41,000	24,000	10,000
600	5,700	240	170	31

Biochemical Oxygen Demand of River Water

The B.O.D. and dissolved oxygen of the Merrimack River were determined on six occasions from June to November, inclusive, at the same stations as during the four previous years. The results shown in the table are somewhat higher than last year, this probably being due to increased activity in the mills.

Station	B.O.D. (Parts per Million)	Dissolved Oxygen Per Cent of Saturation
At Tyngsborough	1.9	69.5
Above Lowell	2.9	73.1
Below Lowell	2.8	72.2
Above Lawrence	3.2	61.0
Below Lawrence	20.8	70.3
Above Haverhill	7.9	75.9
At Groveland	8.9	51.6
Above Amesbury	5.8	63.3
Above Newburyport	5.1	51.1

Purification of Water by Storage

The study of the effect of storage in water purification begun in 1930 has been continued. Two covered concrete tanks, 16 feet in diameter and holding 3 feet 9 inches in depth of water are used; a small door in each allows diffused light to enter during the warmer months but during the winter the doors are closed. The first tank is divided by concrete walls into three sectors, one about twice as large as the other two. The second tank is divided into four equal sectors. These seven compartments are connected in series, the inlet in each case being at the bottom and the outlet near the top. River water is passed into the first compartment continuously and at such a rate that it is thirty days passing through the two tanks. During the year this storage reduced the color of the water abou t9 per cent, the B. coli in the river water was reduced 99.76 per cent and the 20°C. bacteria 93.7 per cent. It also reduced the free ammonia, total and soluble albuminoid ammonia, and oxygen consumed. There was also some nitrification. Last year, when the storage period was forty-five days, the reduction of bacteria was only slightly greater. A sand filter, No. 577, was operated at a rate of 2,500,000 gallons per acre daily with the stored water, and a duplicate filter, No. 576, was operated with river water such as entered the storage tank. Both of these filters contain 4 feet in depth of sand of an effective size of .25 millimeter.

Average Chemical Analyses

(Parts per Million)

		Ammonia				Nitrogen as —			
			Albuminoid						
	Color	Free	Total	In Solution	Chlorine	Nitrates	Nitrites	Oxygen Consumed	Hardness
Filter No. 576:									
Raw river water applied to	43	.298	.212	.173	5.2	.194	.007	4.8	14
Effluent from	27	.035	.108	–	5.2	.264	.010	3.1	14
Filter No. 577:									
Stored river water applied to	39	.029	.128	.116	4.3	.391	.005	3.5	27*
Effluent from	32	.011	.100	–	4.3	.346	.007	3.1	27*

*Increased hardness due to use of concrete storage tanks.

Average Bacterial Analyses

(Parts per Million)

	Bacteria per Cubic Centimeter			B. Coli in 100 cc.
	4 Days 20°C.	24 Hrs.—37°C.		
		Total	Red	
River water before storage	2,300	190	58	2,900
River water after 30 days' storage	145	4	0	7
Effluent from Filter No. 576	63	8	1	39
Effluent from Filter No. 577	51	3	0	5

Lawrence City Filters

As usual this report presents data in regard to the operation during the past year of the slow sand filters for the purification of the water supply of Lawrence. Lawrence has taken its water supply from the Merrimack River since 1875, and since 1893 it has been filtered. Since 1918 the filtered water has been treated with chlorine as an added factor of safety. Three filters are in use. The oldest, 2.2 acres in area, is divided into three sections, one of which is covered; the second, 0.75 of an acre in area, was built in 1907 and is also covered; the third filter, covered also, was completed early in 1926 and is 0.75 of an acre in area. The average volume of water filtered daily during 1933 was 4,556,000 gallons. Liquid chlorine was applied as a solution at the pump-well at the average rate of 1.48 parts per million. This amount of chlorine is very high compared with what is used in other localities, but has been found to be necessary. The chlorinated water is pumped direct to a storage reservoir holding about 41,500,000 gallons, from which the low service system is supplied. Any moderate excess of chlorine is taken care of by the reservoir. No attempt is made to maintain any definite residual chlorine. Daily bacterial samples are taken of the water after chlorination and the amount of chlorine to be added is governed by this. In 1931 an electrically driven pump was installed to supply water for the high service from the reservoir. The bacterial efficiency of the various filters has averaged better than 99 per cent but the B. coli index, or number of B. coli in 100 cubic centimeters, is still higher than now allowed by the U. S. Treasury standard but after chlorination the average number is less than one. There has been some increase in the 20°C. bacteria count in the water of the storage reservoir, due partly to an "after growth" following chlorination and partly to contamination by dust.

Average Bacterial Analyses

Merrimack River — Intake of the Lawrence City Filters

Bacteria per Cubic Centimeter			Per Cent of Bacteria Removed			Per Cent of Samples Containing B. Coli					B. Coli in 100 cc.
4 Days 20°C.	24 Hrs.–37°C. Total	24 Hrs.–37°C. Red	4 Days 20°C.	24 Hrs.–37°C. Total	24 Hrs.–37°C. Red	.001 cc.	.01 cc.	0.1 cc.	1.0 cc.	10 cc.	
10,700	650	193	–	–	–	2	63	98	100	100	8,800
Effluent from the Lawrence City Filter (Old Filter, East Open Section)											
58	5	1	99.5	99.2	99.5	0	0	0	12	45	16
Effluent from the Lawrence City Filter (Old Filter, East Covered Section)											
89	7	1	99.2	98.9	99.5	0	0	0	7	44	11
Effluent from the Lawrence City Filter (Old Filter, West Open Section)											
54	7	1	99.5	98.9	99.5	0	0	0	12	48	17
Effluent from the Lawrence City Filter (North Filter)											
59	6	1	99.5	99.1	99.5	0	0	0	20	68	24
Mixed Effluents as pumped to the Distributing Reservoir after Chlorine Treatment											
8	2	0	99.9	99.7	100.0	0	0	0	0	–*	–*
Water from the Outlet of the Distributing Reservoir											
147	28	1	98.7	95.7	99.5	0	0	0	0	9	1
Water from a Tap at Lawrence City Hall											
141	14	1	98.7	97.8	99.5	0	0	0	0	5	–*
Water from a Tap at the Lawrence Experiment Station											
111	10	1	99.0	98.5	99.5	0	0	0	0	6	–*
Water from a Tap on the High Service System											
134	17	0	98.8	97.4	100.0	0	0	0	0		–*

*Less than 1.

Average Chemical Analyses

Merrimack River—Intake of the Lawrence City Filters

(Parts per Million)

Temperature (Deg. F.)	Appearance		Ammonia			Chlorine	Nitrogen as —		Oxygen Consumed	Iron	Hardness
	Turbidity	Color	Free	Albuminoid			Nitrates	Nitrites			
				Total	In Solution						
49	3	46	.131	.246	.176	3.9	.199	.008	6.5	.730	14
Effluent from the Lawrence City Filter (Old East Filter)											
48	0	48	.173	.106	–	4.9	.324	.004	3.7	1.883	17
Effluent from the Lawrence City Filter (North Filter)											
49	0	31	.033	.102	–	4.8	.341	.003	3.6	.693	15
Water from the Outlet of the Distributing Reservoir											
50	0	38	.071	.108	–	6.1	.324	.003	3.5	1.190	15
Water from a Tap at Lawrence City Hall											
49	0	38	.045	.106	–	6.1	.311	.004	3.3	1.362	15
Water from a Tap at the Lawrence Experiment Station											
52	0	37	.039	.096	–	6.0	.348	.002	3.2	1.400	15

Average Solids

Merrimack River—Intake of the Lawrence City Filters

(Parts per Million)

Unfiltered			Filtered			In Suspension		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
76.0	24.7	51.3	49.7	20.7	29.0	26.3	4.0	22.3
Effluent from the Lawrence City Filter (Old East Filter)								
57.5	20.3	37.2	–	–	–	–	–	–
Effluent from the Lawrence City Filter (North Filter)								
52.1	20.2	31.9	–	–	–	–	–	–
Water from the Outlet of the Distributing Reservoir								
54.3	19.9	34.4	–	–	–	–	–	–
Water from a Tap at Lawrence City Hall								
53.5	20.6	32.9	–	–	–	–	–	–
Water from a Tap at the Lawrence Experiment Station								
53.3	19.0	34.3	–	–	–	–	–	–

STUDIES OF LOSS OF HEAD AND MAXIMUM RATES OF FLOW OF WATER THROUGH FILTERS OF SAND AND OTHER MATERIALS

During the early work of the Experiment Station many researches were made concerning the value, in either water or sewage filtration, of sands of various grades, peat, garden soil, etc. Especial studies were made from time to time of the maximum rates of flow of water through these different materials and articles summarizing some of this work were published in the annual reports of the State Board of Health for 1892 and 1894. Moreover, in the annual report of the Experiment Station for 1892, page 458, a table is given showing with other data the effective size of many of these materials and the maximum rate of flow of water through them. Recently, on account of certain questions now arising, considerable further work of this nature has been carried on, largely in regard to the relation between the depth of filter, the loss of head and the maximum rate of flow allowed by different materials.

For the first study, three filters, 10 inches in diameter and containing 10, 6 and 2 feet, respectively, in depth of sand of an effective size of .26 millimeter and a uniformity coefficient of 3.1, were put in operation. Two feet of clear water was maintained over each filter and the rate kept at 2,500,000 gallons per acre daily, the loss of head being read each day. The water used was tap water practically free from suspended matter hence any loss of head was due to air-binding in the filter. When the rate could no longer be maintained, the filters were slowly back-filled to expel air, and during nineteen months of operation it was necessary to back-fill the 10-foot filter five times; the 6-foot and 2-foot filters twice each. The average loss of head for each filter for nineteen months was as follows: For the 10-foot filter, 2 feet 8 inches; the 6-foot filter, 2 feet 7½ inches; for the 2-foot filter, 1 foot 2 inches. In considering the average loss of head, the number of times the filters were back-filled must be taken into account.

For studies of the maximum rates of certain very fine materials, filters 10 inches in diameter and 4 feet deep were put in operation, two feet of clear water being maintained over the sand. The material of the first filter, No. 603, is hardpan, that is, clay mixed with coarser material, and its effective size is .04 millimeter and its uniformity coefficient, 4.9. The material of No. 604 is river silt, the effective size of which is .05 millimeter and the uniformity coefficient, 2.6. The material of No. 605 is a clayey gravel, somewhat similar to the material in No. 603 except that there is a greater proportion of coarse material. The effective size of this material is .05 and its uniformity coefficient, 11.5. The material of No. 606 is loam from a cultivated garden, with all roots and fibers screened out, and has an effective size of .04 millimeter and a uniformity coefficient of 6.2. These four materials, as will be noted, have nearly the same effective size but differ in uniformity coefficient, chemically and in other respects. The filters were operated with their outlets wide open and the rates read daily.

The average monthly rates at four-month intervals are shown in the following table. The general tendency is toward lower rates largely due to compacting of each material. Undoubtedly the shape of the particles, concerning which no information is given by the mechanical analysis, has much to do with the compacting or reduction of the open space of the material and increasing the resistance to the passage of water through these filters.

The wide variations in rates can only be explained by attributing them to variations in the amounts of air in the filters.

Average Rates

(Gallons per Acre Daily)

Months after start	Filter No. 603	Filter No. 604	Filter No. 605	Filter No. 606
8	304,000	3,280,000	944,000	608,000
12	160,800	1,472,000	608,000	378,000
16	152,000	2,352,000	424,000	1,200,000
20	186,000	1,776,000	704,000	528,000
24	152,000	4,320,000	432,000	3,296,000
28	152,000	1,472,000	432,000	864,000

REPORT OF THE DIVISION OF TUBERCULOSIS

ALTON S. POPE, M.D., *Director*
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DAVID ZACKS, M.D., *Chief of Clinics*

I have the honor to submit the fourteenth annual report of the Division of Tuberculosis. This report includes an outline of the major activities of the Division, the annual reports of the four State Sanatoria, and the Pondville Cancer Hospital for the fiscal year ending November 30, 1933, together with certain developments in policy in the field of tuberculosis control, both in the Department and the State at large.

For the first time since 1926 the deaths from pulmonary tuberculosis failed to show a substantial decline. During the year 2,058 deaths were reported, compared with 2,041 in 1932. While this very slight increase may be nothing more than a chance variation, it is suggestive that since May every month has shown an increase in reported deaths over the corresponding month of 1932. As yet there has been no increase in reported cases. It will be noted that the continued drop in deaths from extra-pulmonary tuberculosis offsets the slight increase in pulmonary deaths, so that the rate for all forms is substantially the same as last year.

TUBERCULOSIS DEATHS AND DEATH RATES PER 100,000
Massachusetts 1924–1933

YEAR	PULMONARY		OTHER FORMS		TOTAL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1924	2,953	72.0	577	14.1	3,530	85.7
1925	2,883	69.3	576	13.9	3,459	83.4
	2,961	71.0	555	13.3	3,516	84.3
1927	2,774	66.2	429	10.2	3,203	76.4
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.9	248	5.8	2,554	59.7
1932	2,041	47.5	261	6.1	2,302	53.5
1933	2,058	47.7	222	5.1	2,280	52.8

STATE SANATORIA

During the year the four State sanatoria have furnished 418,156 days of treatment for 2,156 patients. Of these cases 1,188 were in the institutions at the beginning of the year and 968 represents new admissions. The cases were divided as follows: Rutland, 725 cases of pulmonary tuberculosis; North Reading and Westfield, 945 children with adult or childhood type of the disease; Lakeville, 486 patients with extra-pulmonary forms of tuberculosis; 39 less patients were treated than last year and 11,504 less days of treatment were provided. This slight decrease in the number of cases treated obviously represents an attempt at economy on the part of certain local boards of health, which in some instances have been unwilling to avail themselves of the facilities provided for the treatment of tuberculosis. The last four months of the year, however, showed an increased demand for beds at all of our sanatoria.

The per capita costs at the State sanatoria show a still further reduction from 1932. At Rutland the cost was $15.51; at North Reading $14.80; at Westfield $16.81; and at Lakeville $16.79 per week. This further decrease in operating costs is due entirely to the salary reductions which have been effective during eight months of the fiscal year.

Since the completion of the building program at the State sanatoria in 1932 the principal efforts have been directed toward the improvement of medical service in the institutions, and the extension of diagnostic service to the surrounding communities. Earlier diagnosis still remains the outstanding problem in both the prevention and treatment of tuberculosis, as witnessed by the fact that 35 years after the opening of the first state sanatorium in the country scarcely 10 per cent of the patients are admitted in a minimal stage of the disease. Just what this means is illustrated by some figures recently compiled on the present condition of some 400 patients admitted to Rutland in 1925 and 1926. Subdividing this group according to stage on admission to sanatorium, it was found that among patients admitted in a minimal stage all but 17 per cent were still living, while among those in a moderately advanced stage 41 per cent, and among those in a far advanced stage 78 per cent had subsequently died. From the standpoint of prevention the early discovery of tuberculosis is even more important, as the majority of moderately and far advanced cases are capable of spreading the infection before their condition is suspected.

To meet this problem the Department had expanded its diagnostic facilities, and through the out-patient departments and consultation clinics of its four sanatoria examined 5,364 patients in 1933. The great majority of these cases were referred by their private physicians and reports of the findings were made directly to the doctor. Because X-Ray examination is essential for the early diagnosis of tuberculosis and the majority of patients cannot themselves afford it, the Department feels that it should be offered to physicians by the State or county on the same basis on which diagnostic laboratory service has long been furnished. During the past year also on the admission of each patient to the sanatorium, a letter has been sent to the physician who signed the application, asking if he has arranged for the examination of all family contacts and offering the diagnostic facilities of the sanatorium, if desired.

The opening of the new Worcester County Sanatorium in February withdrew some 75 patients from Rutland, but the latter institution finished the year with a full house. The medical and surgical work at Rutland has shown a steady growth during the year. Pneumolysis is now carried out at the institution, and is proving a valuable adjunct to pneumothorax. Approximately 62 per cent of all patients in the sanatorium are now receiving some form of collapse therapy. A pathological service has been established with a full-time resident pathologist and a pathological consultant, and pathological service will be furnished to the North Reading and Westfield State Sanatoria from Rutland.

During the year two new monthly consultation clinics, staffed from Rutland, have been opened in Worcester County. The Southbridge clinic is held in the out-patient department of the Harrington Memorial Hospital, using the hospital X-Ray unit. The Athol clinic is held at the local Board of Health rooms with a portable X-Ray from the Westfield State Sanatorium. Each of these clinics serves a considerable group of surrounding towns and provides modern diagnostic facilities for tuberculosis not previously available in those areas.

Current economic conditions were reflected in a slight fall in the average number of patients at Lakeville. There has, however, been steady improvement in the quality of medical and surgical work. During the year consultants were added in ophthalmology and urology, fields that present special problems in extra-pulmonary tuberculosis. A consultant surgeon was also appointed to care for the general surgery in the institution. The position of Assistant Superintendent, left vacant by the resignation of Dr. George L. Parker, was filled by the appointment of Dr. John J. Decker, formerly of the Pondville staff. During the summer three theological students on scholarships from the Andover-Newton Seminary spent three months at the sanatorium, working part-time on the wards and studying social aspects of illness and of the care of the sick. The excellent occupational therapy shop has been in constant use and is already overcrowded. An addition to the present shop should, if possible, be provided in the 1934 budget.

The steady growth of the out-patient and consultation work at North Reading has been very gratifying. During the year a total of 1,379 patients were examined in the out-patient department and in the consultation clinics in Haverhill and Lawrence. The installation of a new timer on the sanatorium X-Ray has been of material assistance in this diagnostic work.

The development of special classes in the school, including manual training, has in connection with Dr. Cooper's clinics in Mental Hygiene, gone far toward solving the vexed problem of the readjustment of the problem child in the institution. The installation of sound picture equipment was made necessary by the difficulty in securing silent films for the children.

New consultation clinics at Greenfield and Great Barrington have been opened by Westfield State Sanatorium during the year. In both places the clinic is held in the local general hospital, using the local hospital X-Ray and films provided by the sanatorium. Capacity attendance at both clinics from the start is sufficient evidence of the willingness of Massachusetts physicians to utilize modern diagnostic facilities in tuberculosis when they are made available. Total diagnostic examinations in the clinics and the out-patient department reached a new high this year, 2,694 patients. During the past year all patients at Westfield and North Reading, and the children at Lakeville, have been immunized with scarlet fever toxoid, in addition to diphtheria toxoid. No cases of scarlet fever or diphtheria have occurred in the institutions during this year.

Continued low commodity prices and State salary reductions have resulted in the lowest per capita costs at the sanatoria for many years. At Rutland this drop in operating costs has made it possible to lower the charge to cities and towns from $17.50 to $16.00 per week, and has, we believe, been of distinct value in securing the prompt admission of a number of patients who were on the waiting lists of county sanatoria. This decrease in operating costs has in no sense been made at the expense of the patient as there has been a steady increase in both the quality and quantity of the medical work at all the sanatoria.

Among the urgent needs of the sanatoria should be included houses for the superintendents at Rutland and North Reading. The medical superintendent of a tuberculosis sanatorium should be able to get away from his work, at least at night, and at both these institutions the present superintendent's quarters are urgently needed for other staff accommodations. At Rutland the sanatorium road has been in bad condition for a number of years, and should be rebuilt at once, both to accommodate the heavy traffic to the institution and to abate the dust nuisance. Two of the boilers at Rutland must be replaced at once and funds for that purpose have been approved by the Emergency Public Works Commission. Additions to the filter beds at Westfield and Lakeville have also been approved by the Public Works Commission.

Because the recommendations of the Recess Committee were not accepted by the 1933 Legislature, the Department is still unable to secure uniform rates for State and county sanatoria, and a considerable number of patients have been kept on the waiting list of county institutions for financial reasons when they might have been admitted promptly at Rutland. To meet this situation and to secure as complete and economical use of all of our sanatoria as possible, legislative authorization should be secured as soon as possible to bring the Rutland rates into the range of county sanatorium charges.

Pondville Cancer Hospital

After having apparently reached its ultimate capacity last year, Pondville has again shown an amazing increase in both admissions and medical service in 1933. With no additional beds, over 200 more patients were admitted than during the previous year, a total of 1,203. This was made possible by increased work by the resident staff together with more frequent visits by members of the visiting staff, and as a result the average patient's stay in the hospital was reduced from 44 to 37 days. While the number of patients was 18 per cent higher than last year, the number of operations was 36 per cent greater for the year. Autopsies increased 21 per cent, though the number of deaths increased only 1.2 per cent. In the out-patient department the average attendance at the Thursday clinic rose from 43 to 53, and total out-patient visits from 3,501 to 4,429. In spite of this phenomenal increase in service with very limited facilities there were approximately 60 patients on the waiting list at the end of the year. The persistence of such a waiting list in spite of a marked increase in admissions of cancer patients to general hospitals, and after the opening of the Rose Hawthorne Lothrop Cancer Hospital in Fall River, is sufficient evidence of the urgent need of additional facilities at Pondville. Plans for an adequate service and surgical building and a 25-bed wing on the hospital building have been approved by the Emergency Public Works Commission, and it is hoped that funds for their construction will be made available in the near future.

County Sanatoria

The opening of the new Worcester County Sanatorium in February was another important milestone in the development of hospitalization of tuberculosis in Massachusetts. The new Worcester County institution offers every modern facility for the treatment of tuberculosis, and should rapidly become an important diagnostic as well as therapeutic center for the county.

The really serious need for increased facilities at a county institution is at the Hampshire County Sanatorium. Besides being a serious fire hazard the present patients' building is inadequate to meet the combined needs of Berkshire, Franklin, Hampden and Hampshire Counties. To meet this demand a fireproof building of approximately 50 beds, with modern facilities for collapse therapy, should be provided as promptly as possible.

During the year the Barnstable County Sanatorium has established diagnostic clinics at the Martha's Vineyard, Nantucket, and Hyannis Hospitals. In this way the sanatorium is not only doing much to make possible the earlier diagnosis of tuberculosis, but at the same time is bringing the facilities of the sanatorium to the physicians and their patients.

The year has shown a gratifying increase of collapse therapy in county as well as in State sanatoria. A recent questionnaire showed that of 1,088 patients in county hospitals 220 or 20.2 per cent were receiving pneumothorax. In addition to this 121, approximately 11 per cent had phrenicectomy and 4.6 per cent thoracoplasty. In several of these institutions pneumolysis is being used as an adjunct to pneumothorax. This growth of collapse therapy has been accompanied in practically all of the sanatoria by an increase in the medical personnel, which in turn has made possible a distinct improvement in the quality of all medical service rendered the patients.

Social Service

On November 1, 1933 a third social worker, resident at the Westfield State Sanatorium, was added to the Division staff. This increase in personnel was made necessary by the growing demand for social service work in connection with our sanatoria, and the practical difficulty of adequately covering the western part of the State from the central office. A consultation service in the Southern Berkshire Health District was added during the year.

Experience is showing more and more clearly that in tuberculosis social and environmental factors are inextricably associated with prevention, treatment, and the readjustment of the patient following convalescence. Particularly in these days of economic stress are we finding social service a valuable ally in securing home conditions which make effective control possible.

During the year 693 home calls have been made by our workers; various medical and social agencies have been contacted 1,722 times; and 123 cities and towns have been visited.

The Ten–Year Program

It is an unusual piece of good fortune that we can record the return of Dr. Chadwick for the conclusion of the Ten-Year Program. By agreement with the Legislature the original clinic plan will terminate in June, 1934, and during the past year the Department has been engaged in working out a plan for decentralization and the perpetuation of the essential features of the program.

The proposed plan calls for the examination of each child three times during his school life: in the 7th, 9th, and 11th grades. The examination is to consist of a routine tuberculin test, with X-Ray of the positive reactors. Children who show X-Ray signs of infection will receive a physical examination and the findings will be reported to the family physician, if there is one, otherwise to the parents and the local board of health. It is planned that the examination will be incorporated in the regular school medical examination for the respective grades and that the tuberculin test will be performed by the school or board of health physician. X-Ray service will be provided by the county or State sanatoria, and the films interpreted by the superintendent. Examination of the family contacts of children found to have tuberculosis will, whenever possible, be carried out by the sanatorium staff as a part of the case-finding program. The examinations will be organized by a nurse on the sanatorium staff and nursing service provided by the school committee or local board of health. This plan has been approved by the Advisory Committee of County and State Superintendents, and the Massachusetts Tuberculosis League, and we believe offers a simple and practical system of case-finding in children. It has the advantage of placing the responsibility for tuberculosis control on the local health authorities, where it belongs, and while furnishing them the necessary technical assistance in diagnosis, at the same time brings the sanatorium much closer to the communities in the whole tuberculosis program.

The Department feels an obligation to continue the supervision of the group of some 10,000 children now on the Follow-Up Clinic and for the present will continue a small field unit for that purpose and for assisting the County and State sanatoria in the reorganization of the school clinic work.

During the school year 1932-1933 the Chadwick Clinic worked first in the western counties, the Connecticut Valley, eastward to the Metropolitan area and finally in Norfolk and Bristol Counties. A total of 58,032 children in 70 towns were tested. The proportion of consents for examination continued high, 65 per cent in the grades and 60 per cent in the high schools. The percentage of reactors came back to earlier levels, 25 per cent in grade children, and 44 per cent among high school students. The importance of family contact in tuberculous infection was strikingly brought out by separating the findings for contact and non-contact children during the second half of the year. As compared with the whole group tested (above) the percentage of reactors in the contact children was 66 per cent in the grades, and 85 per cent in the high schools. The proportion of pulmonary and suspect pulmonary cases among contact children was even more striking, being in the grades ten times, and in high schools more than 30 times as high as in non-contacts.

In connection with the regular school clinics, in Norwood and Beverly arrangements were made with the local boards of health for the routine examination of the family contacts of children found to have tuberculosis. In each place several hundred of such contacts were X-Rayed and a substantial number of unrecognized cases of pulmonary tuberculosis were located. It is of limited value to discover and treat tuberculosis in children if unrecognized sources of infection continue to spread the disease in the home, and whenever possible tuberculosis examinations in children should be made to find the source of infection in the family.

Following is the summary of the ninth year's work of the Chadwick Clinics:

Total school population of towns visited	92,080
Number given Von Pirquet test	58,556*
Number of reactors	17,188
Number X-Rayed	17,605
Number examined	4,070
Number contacts examined	1,083
Number diagnosed as pulmonary tuberculosis	20
Number diagnosed as pulmonary suspects	27
Number diagnosed as hilum tuberculosis	672
Number diagnosed as hilum suspects	2,119

*13,692 of these were in high schools.

SUMMARY OF NINE YEARS' WORK

	Date	Number of Children examined	Number of Contacts examined	Number given Tuberculin Test	Number of Reactors	Per Cent of Reactors	Number of Children X-Rayed	Number of Cases of Pulmonary Tuberculosis	Per Cent of Pulmonary Cases of Number given Test	Number of Cases of Hilum Tuberculosis	Per Cent of Hilum Cases of the Number given Test	Number of Cases classified as Suspects
First year	1924–1925	10,648	1,612	10,016	2,927	29	3,008	31	.31	561	5.6	1,114
Second year	1925–1926	19,073	2,955	18,601	5,314	29	6,121[1]	19	.1	621	3.3	1,399
Third year	1926–1927	19,527	2,367	19,194	5,188	27	6,338[1]	29	.1	524	2.7	1,112
Fourth year[2]	1927–1928	26,177	913	26,052	7,219	28	7,909[1]	8	.03	376	1.4	896
Fifth year	1928–1929	25,693	930	25,699	7,423	29	9,446[1]	11	.04	415	1.6	848
Totals for first five years .		101,118	8,777	99,562	28,071	28	32,822[1]	98	.10	2,497	2.5	5,369
Sixth year[3]	1929–1930	2,459	309	49,379	11,298	23	11,277	26	.05	439	.9	1,065
Seventh year[4]	1930–1931	3,476	450	57,412	16,426	29	16,612	31	.05	409	.7	1,654
Eighth year[5]	1931–1932	3,865	579	68,899	13,254	19	13,396	48	.07	553	8	2,086
Ninth year[6]	1932–1933	4,070	1,083	58,556	17,188	29.3	17,605	20	.03	672	1.15	1,498
Totals for nine years (Grade and High) . .		114,988	11,198	333,808	86,237	25.8	91,712	223	.07	4,570	1.38	12,293

[1] This figure includes X-rays of Re-examinations, Summer Camp Children Adults, and Special Requests.

[2] The first three years an attempt was made to examine the contact cases and the children who were 10 per cent or more underweight.

[3] These figures include the examination of 7,318 high school students.

[4] These figures include the examination of 8,731 high school students.

[5] These figures include the examination of 1,973 high school students.

[6] These figures include the examination of 1,024 high school students.

SILICOSIS STUDY

During the summer vacation the field clinic staff were engaged in the clinical and epidemiological aspects of a study of silicosis in granite and foundry workers. By act of the 1933 Legislature the State Commissioners of Labor, Health, Industrial Accidents, and Insurance, together with the Attorney General, were appointed as a Recess Committee to investigate the health hazards in the granite and foundry industries in Massachusetts, to report their findings and to make recommendations concerning the special hazards found to the Legislature of 1934.

Plants representative of the granite industry were selected in Quincy, Milford, Fitchburg, and Westford, and a total of 961 granite workers out of 1,591 employed in these establishments were examined.

Measurements of the concentration of process dusts in these plants and in the specific occupations of each were made by an engineer from the Department of Labor and Industries. Assistance in interpretation of the X-Ray plates was generously given by Dr. Leroy U. Gardner and Homer Sampson of Saranac Lake, and by Dr. Henry Pancoast of Philadelphia.

As a result of these examinations it was found that 22.8 per cent of the granite workers and 11.4 per cent of the foundrymen had definite silicosis, while 9.1 of the employees in granite works and 3.4 per cent of the foundrymen had pulmonary tuberculosis. Such findings become even more striking when it is considered that only men working or able to work were examined. In both granite and foundry workers there were high correlations between the length of employment in the industry and the incidence of silicosis and tuberculosis, and between the dust concentration and silicosis and tuberculosis. Investigation of deaths of granite workers in Milford and Quincy for a twelve-year period showed a proportionate mortality from tuberculosis three times that of the general male population over twenty. Among foundrymen the excess mortality from tuberculosis was about 50 per cent, but the porportionate mortality from pneumonia was nearly three times that of the corresponding age group.

The importance of such findings among workers exposed to siliceous dusts calls for no extended comment. Silicosis and the accompanying tuberculosis present one of the most serious health hazards in industry today, and it is only through a more complete knowledge of the various factors concerned in their etiology that we can hope to work out effective methods of prevention and so avoid the expensive and demoralizing experience of some states in that field.

Appreciation is gratefully acknowledged of the interest and loyalty of the members of the clinic staff who often at personal sacrifice arranged for and carried out the examinations on which this study is based.

SUBSIDY

The recent rapid increase in the payment of State subsidy for the hospitalization of tuberculous patients in sanatoria approved by the Department has been continued by the opening of the new Worcester County Sanatorium last February. In 1932 the Department of Public Health paid $405,000 for subsidy claims. This year $450,589.92 will be required for that purpose. Such a subsidy constitutes a heavy fixed charge on the Department, and since the completion of the county building program the only justification for its continuation is that it may in some instances facilitate hospitalization, and assist in raising standards of treatment. If it could be made dependent also upon reasonable standards of diagnostic and nursing service in the communities it would contribute much more directly to the control of tuberculosis.

LAKEVILLE STATE SANATORIUM

RESIDENT OFFICERS

LEON A. ALLEY, M.D., *Superintendent.*
JOHN J. DECKER, M.D., *Assistant Superintendent.*
ARTHUR KANSERSTEIN, M.D., *Senior Physician.*
RICHARD C. COOKE, M.D., *Assistant Physician.*
LOUIS ALPERT, M.D., *Assistant Physician.*
C. WINTHROP HOUGHTON, M.D., *Assistant Physician.*
CHIN S. CHANG, M.D., *Assistant Physician.*
EMANUEL KLINE, D.M.D., *Dentist.*
CAROLINE T. WHITE, R.N., *Superintendent of Nurses.*
FLORENCE S. MONROE, *Treasurer.*
MARY C. O'CONNELL, *Head Teacher.*
KATHERINE NUTE, *Head Occupational Therapist.*
SUSAN M. MURPHY, *Head Housekeeper.*
CHESTER TAYLOR, *Steward.*
ROBERT A. KENNEDY, *Chief Power Plant Engineer.*
T. FRANK MAHONY, *Head Farmer.*

NON-RESIDENT OFFICERS

ZABDIEL B. ADAMS, M.D., *Senior Physician, Orthopedist.*
LOUIS A. O. GODDU, M.D., *Senior Physician, Orthopedist.*
ROGER C. GRAVES, M.D., *Senior Physician, Urologist.*
FLETCHER H. COLBY, M.D., *Senior Physician, Urologist.*
WILLIAM P. BEETHAM, M.D., *Senior Physician, Ophthalmologist.*
GEORGE A. MOORE, M.D., *Senior Physician, Surgeon.*

Report of the Superintendent

To HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health*:

I have the honor to submit the twenty-fourth annual report of the Lakeville State Sanatorium for the year ending November 30, 1933.

FINANCIAL STATEMENT

During the year there has been expended $246,866.10 for maintenance, a gross weekly per capita cost of $16.79. There has been collected from miscellaneous sources (the total of all collections) $120,324.32. Deducting this amount from the gross maintenance expense a net expense of $126,541.78 and a net weekly per capita cost of $8.61. There has been collected from private sources $3,488.49, from cities and towns $115,057.50, from the State Board of Retirement $107.68, and from sales $1,615.42 plus $55.23 for interest on bank balances.

There were 11 patients supported wholly or in part by private funds, 183 by cities and towns, 2 State wards, 38 wholly by State, and 37 on whom settlement has not been determined.

As authorized by Chapter 1, Acts of 1931 ($17,000 for alteration of two buildings) $15,993.52 was expended prior to 1933 and $678.65 during 1933. Completed. As authorized by Chapter 1, Acts of 1931)$5,700 for repairs and improvements(expended prior to 1933 $5,601.43. Nothing during 1933. Completed.

POPULATION

There were 284 patients in the sanatorium at the beginning of the year, December 1, 1932, and 271 patients at the close, November 30, 1933. The largest number present at any one time was 299 and the smallest 259. The daily average number of patients was 282.77, children 175.38, adults 107.39. There were 202 patients admitted during the year. For the classification of patients admitted, your attention is called to Table 6. The average age of patients admitted was 28 years. Including deaths there were 216 patients discharged and the average duration of residence was 532 days. Of those discharged 133 patients gained 2,442.25 pounds, an average gain of 18.36 pounds per person. Of those discharged there were 102 arrested, 14 apparently arrested, 16 quiescent, 22 improved, 6 unimproved, 28 deaths, 14 not considered (duration of treatment being less than one month) and 14 non-tuberculous. There were 103,211 hospital days of treatment, 3,091 less than last year. Average number of employees and officers during the year was 178.6.

Medical Report

There has been a considerable increase in our death rate during the past year which can be explained by the admission of more patients with marked advance disease. Seventeen post-mortem examinations were made, six more than last year.

Eight per cent of the 202 patients admitted during the year showed, on routine X-Ray examination, evidence of hilum or pulmonary infection.

Additions to the consulting staff have again made it possible to eliminate the necessity for patients to travel to Boston. Services now available provide for the complete care of genito-urinary and eye diseases. All necessary surgery in the genito-urinary group is now done in the sanatorium. The addition of the slit-lamp to our equipment for the care of the eye cases makes it possible to determine the exact condition of their local disease.

Articles entitled "A Report of Seventeen Cases of Tuberculosis of the Hip Fused by the Wilson Method" and "The Sanatorium Treatment of Lupus" by Dr. Louis Alpert, assistant physician, were published in The Journal of Bone and Joint Surgery, January 1933 and The American Review of Tuberculosis, May 1933, respectively. An article on "Human and Bovine Infection in Extra-Pulmonary Tuberculosis" by Dr. Chin S. Chang, assistant physician, was published in the New England Journal of Medicine October 5, 1933.

The institution was again approved by the American College of Surgeons.

Institutional Activities

During the year the institution has entertained many groups from various organizations and medical schools and lectures on the activities of the institution have been delivered by members of the resident staff. The farm report reflects a successful year's work.

Personnel Changes

Dr. Richard Metcalf resigned as assistant physician on April 29, 1933, to enter private practice and Dr. John J. Decker was transferred from Pondville and appointed assistant superintendent May 14, 1933. Dr. Jean L. LeBlanc resigned as assistant physician on July 11, 1933, to enter private practice and Dr. C. Winthrop Houghton, graduate of Boston University was appointed July 17, 1933. During the latter part of the year Dr. Roger C. Graves of Boston was appointed consulting urologist with Dr. Fletcher H. Colby as an alternate, Dr. William P. Beetham of Boston was appointed consulting ophthalmologist, and Dr. George A. Moore of Brockton was appointed consulting surgeon.

Recommendations

Our experience during the past few winters with the use of the High Intensity Carbon Arc lamp on Children's West Ward has demonstrated the necessity of similar equipment on both the men's and women's wards. The transportation problem makes it impossible for the patients in the men's and women's buildings to receive the benefit of the artificial heliotherapy available to the children. We have again asked for funds in the budget for 1934 for the construction and equipment of these rooms.

A new X-Ray and fluoroscopic unit is urgently needed. Our present equipment is badly out of date and wholly inadequate for the type of work required of it. In view of the increasing amount of chest work being done both in the hospital and in the out-patient department it is especially important that this need be met as promptly as possible and a request for the same has been included in the current budget.

Additional refrigerating space and equipment are badly needed. Our present ice boxes are too small and the equipment inadequate to take care of any additions.

ACKNOWLEDGMENTS

I wish to extend my sincere appreciation to the clergymen, consultation staff, and all other loyal employees who have rendered faithful services during the year. The progress and work accomplished has been made possible by their efforts and support.

SURGICAL REPORT

Operations

The following operations were performed during the year:

Appendectomy	5
Arthrodeses:	
Astragalotibial and astragaloscaphoid	1
Hip	7
Knee	6
Sacro-iliac	4
Spine	18
Arthrodesis and ostectomy of hip	1
Reduction and arthrodesis of hip	1
Biopsy and arthrodesis of hip	1
Biopsy	1
Resection of portion of cord	1
Curettage Brodie's abscess	1
Curettage and pack of tuberculous focus	1
Exploratory laparotomy	1
Complete hysterectomy, bilateral salpingectomy and femoral herniotomy	1
Laminectomy	3
Nephrectomy	1
Osteotomy of hip	1
Abscess on arm	4
Abscess on face	2
Abscess on neck	1
Cauterization rectal tab and fissure	1
Cystoscopy	6
Laceration requiring sutures	2
Removal cervical glands	1
Removal splinter from hand and under finger nail	2
Tonsillectomy and adenectomy	22
Transfusion	2
Total	98

Casts

Plaster casts for the year were as follows (types classified):

Anterior shell	30
Posterior shell	30
Boot	57
Cylinder to arm	10
Cylinder to knee	54
Cylinder to wrist	8
Cylinder and boot	14
Jacket	84
Jacket with collar	8
Jacket with cylinder to arm	12
Jacket with double short spica	61
Jacket with single spica	15
Jacket with long spica	16
Jacket with straps	98
Jacket with helmet	25
Jacket with helmet and short double spica	1
Short spica	52
Long and short spica	58
Long and single spica	38
Long and double spica	12
Posterior splint	3
Moulds	4
Total	690

Consultation Examinations

	Positive	Suspicious	Negative	Extra-Pulmonary	Re-Exam.	Ex-Patients	Totals
Out-patients	12	6	74	4	18	41	155
Employees	–	1	86	–	–	–	87
	12	7	160	4	18	41	242

Laboratory Report

Laboratory, X-Ray and Photographic Report

			Number
Clinical Microscopy			
	Blood	Hemoglobin determination	880
		Red blood cell counts	880
		White blood cell counts	1,374
		Differential counts	405
		Blood culture	18
		Blood groupings	24
		Coagulation time	25
		Bleeding time	25
	Chemical Analysis:		
		Blood sugar	3
		Non-protein nitrogen	26
		Blood calcium	2
		Occult blood	165
		Guaiac test	165
		Gastric contents	3
		Van den Bergh test	4
		Icterus	2
	Sputum	Positive T.B.	21
		Negative T.B.	571
Urine Analysis			4,736
Spinal fluid		Positive T.B.	2
		Negative T.B.	3
Feces			168
Pleural fluid			16
Bacteriological and Serological Tests:			
	Nose and throat cultures—Negative K.L.		222
	Smears and cultures		3,493
	Isolation and cultivation of tubercle bacilli		275
	Phenolsulphonphthalein tests		190
	Typhoid agglutination tests (Widal)		81
	Milk plate count		28
Wassermann tests		Positive	12
		Negative	210
		Doubtful	15
Hinton tests		Positive	22
		Negative	194
		Doubtful	4
Von Pirquet test		Positive	167
		Negative	18
Mantoux tests		Positive	12
		Negative	5
Animal Experimentation:			
	Inoculations	Guinea pig	169
	Autopies	Positive T.B.	59
		Negative T.B.	109
			14,803
Pathology:			
	Surgical cases		39
	Biopsies		4
	Post-mortem cases		17
	Tissue sections (celloidin)		428
	Tonsils	Positive T.B.	15
		Negative T.B.	79

Preparation of Media (each month):

Glycerine bouillon	13
Glycerine agar potato	6
Blood agar plate	11
Petroff's medium	14
Leoffler's blood medium	16
Eosin methylene blue agar	2
	15,447

Pathological Diagnosis:

Histological tuberculosis	7
Chronic inflammation	7
Papilloma	1
Malaria parasites	1
Appendicitis	5

Proven Tuberculosis:

Diagnosis (by guinea pig)	
Tuberculous abdomen	3
Tuberculous ankle	2
Tuberculous ensiform	1
Tuberculous gland	7
Tuberculous hip	11
Tuberculous kidney	8
Tuberculous knee	6
Tuberculous meningitis	1
Tuberculous rectal fistula	2
Tuberculous skin	1
Tuberculous spine	5
Tuberculous testicle	1
Tuberculous thumb	1
Tuberculous wrist	1
Pulmonary tuberculosis	1
	72

Examinations for other hospitals:

Urine	4
Guinea pig test	9
Tonsils	22
Smear for G.C.	3
Throat culture	3
Pathological examination	2
Blood count	3
Blood grouping	38
Non-protein nitrogen	1
Blood sugar	1
	86

X-Rays

Number of X-Rays taken from December 1, 1932, to November 30, 1933	2,216

Photographs

Number of photographs taken from December 1, 1932, to November 30, 1933	399

DENTAL REPORT

From December 1, 1932, to November 30, 1933

Examinations	781
Prophylactic treatments	484
Fillings:	
Permanent teeth	675
Temporary teeth	97
Extractions:	
Permanent teeth	202
Temporary teeth	243
Treatments	710
Restorations:	
Dentures:	
Full	5
Partial	2
Repair	1
Radiographs	233
Irrigations	224
Vincent's infection treatments	17
Root canal treatments	3
Pulpectomy	1
Apicoectomy	1
General anesthesia:	
Ether	1
Nitrous oxide	1
Ethyl chloride	4
Local anesthesia:	
Novocaine	223
Ethyl chloride	88
Topical	153
Oral surgical operations	17
Orthodontia treatments	19
Total	4,185

Visits	2,005
New patients	226
Dismissals	430

An educational program in oral hygiene was given the patients through the medium of:

1. Personal instruction at the chair in the dental office.
2. Articles inserted in "The Interpreter," the institution monthly publication.
3. Moving picture films loaned by the Department of Public Health and exhibited in the Assembly Hall.
4. Printed literature from various sources.

The experiment on diet and nutrition in relation to dental health was carried on throughout this past year. The four surveys, ending last February, briefly showed a marked decrease in the incidence of dental caries among the boys who were receiving eight ounces of tomato juice per day. The girls, who acted as the control, not receiving any tomato juice, did not show any change in this respect. Then in February the procedure was reversed, the boys were taken off the tomato juice diet and the girls were put on.

SCHOOL REPORT

This completes the fifth year of the academic school work with the children of school ages. One hundred and twenty children, divided into sixteen groups received instructions. Many of the children, retarded because of their long illness, showed marked improvement during the year as the result of regular class work plus the benefit of many extra hours of special help.

Follow-up records on discharged patients continue to show a very high percentage of the children enter their normal grade, even after two, three, or more years of residence in the sanatorium.

Classes in Americanization, Home Hygiene and Health have been conducted for the older patients. Braille classes have been held for those suffering from partial or total loss of eyesight. Forty patients have had the benefit of correspondence courses made possible through the cooperation of the State Department of Education. In these courses tutoring has been given by members of the teaching and occupational therapy staffs.

During the summer months theoretical and practical training was made possible at the sanatorium for three theological students by means of scholarships in connection with their seminary curriculum. This proved to be of definite value to the students and the sanatorium. In addition to their morning work on the wards in the care of the sick they contributed generously of their time for the private tutoring of individual patients as well as to general sanatorium activities.

Daily classes have been conducted in the occupational therapy workshop for ambulatory patients. This sort of activity serves a very useful and important purpose in the daily life of the patients both old and young of both sexes and is conducted along strictly therapeutic lines.

Respectfully submitted,
LEON A. ALLEY, M.D.
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Adults		Children		Totals
	Males	Females	Males	Females	
Patients in the Sanatorium Nov. 30, 1932	48	53	114	70	285
Patients admitted Dec. 1, 1932, to Nov. 30, 1933	74	53	37	38	202
Patients discharged Dec. 1, 1932, to Nov. 30, 1933	60	61	57	38	216
Patients remaining in the Sanatorium Nov. 30, 1933	66	46	90	69	271
Daily average number of patients	59.71	47.68	106.14	69.23	282.77
Deaths (included in number discharged)	9	10	7	2	28

TABLE 2.—*Civil Condition of Patients Admitted*

	Adults Males	Adults Females	Children Males	Children Females	Totals
Single	37	23	37	38	135
Married	32	25	–	–	57
Widowed	4	1	–	–	5
Divorced	1	2	–	–	3
Separated		2	–	–	2
Total	74	53	37	38	202

TABLE 3.—*Age of Patients Admitted*

	Adults Males	Adults Females	Children Males	Children Females	Totals
Under 5 years	–	–	7	3	10
5 to 9 "	–	–	6	3	9
10 to 14 "	–	–	7	14	21
15 to 19 "	–	–	14	17	31
20 to 29 "	22	29	3	1	55
30 to 39 "	20	9	–	–	29
40 to 49 "	13	6	–	–	19
50 to 59 "	12	6	–	–	18
60 to 69 "	6	3	–	–	9
70 and over	1	–	–	–	1
Total	74	53	37	38	202
Average Age 28 years.					

TABLE 4.—*Nativity and Parentage of Patients Admitted*

	Adults						Children						Totals		
	Males			Females			Males			Females					
Place of Nativity	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:															
Massachusetts	28	11	11	31	10	10	32	16	13	34	12	12	125	49	46
Other New England States	7	6	6	4	5	4	4	2	3	2	1	1	17	14	14
Other States	5	4	5	2	2	3	1	–	–	–	1	–	8	7	8
Totals	40	21	22	37	17	17	37	18	16	36	14	13	150	70	68
Other Countries:															
Albania	2	2	2	–	–	–	–	–	–	–	–	–	2	2	2
Armenia	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Brazil	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Canada	7	9	11	6	10	9	–	4	4	1	2	3	14	25	27
Denmark	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–
England	–	2	1	–	1	1	–	–	–	–	1	1	–	4	3
Finland	–	–	–	–	–	–	–	–	–	–	1	1	–	1	1
Germany	–	–	–	–	1	1	–	–	–	–	–	–	–	1	1
Greece	1	1	1	–	–	–	–	–	–	–	2	2	1	3	3
Ireland	3	11	8	3	8	10	–	1	2	–	2	1	6	22	21
Italy	7	10	10	3	4	4	–	5	5	1	6	6	11	25	25
Lithuania	2	2	2	–	–	–	–	1	1	–	1	1	2	4	4
Newfoundland	3	3	3	–	–	–	–	–	–	–	1	1	3	4	4
Norway	–	–	–	1	2	1	–	–	–	–	–	–	1	2	1
Poland	–	2	2	–	2	2	–	3	2	–	1	1	–	8	7
Portugal	1	1	2	2	5	5	–	3	4	–	3	3	3	12	14
Russia	5	6	6	–	1	1	–	–	1	–	1	–	5	8	8
Scotland	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Syria	–	–	–	–	–	–	–	–	–	–	1	1	–	1	1
Sweden	2	2	2	1	1	1	–	–	–	–	–	–	3	3	3
Unknown	–	1	1	–	1	1	–	2	2	–	1	2	–	5	6
Totals	74	74	74	53	53	53	37	37	37	38	38	38	202	202	202

TABLE 5.—*Residence of Patients Admitted*

	Adults	Children	Totals
Abington . .	1	–	1
Adams . .	1	–	1
Amesbu . .	–	1	1
Amherst . .	1	–	1
Andover . .	1	1	2
Arlington . .	3	–	3
Attleboro . .	1	–	1
Belmont . .	1	–	1
Boston . . .	28	23	51
Braintree . .	–	1	1
Bridgewater .	2	–	2
Brockton . .	3	1	4
Brookfield . .	–	1	1
Brookline . .	1	–	1
Cambridge . .	10	6	16
Chelmsford . .	–	1	1
Chelsea . .	4	–	4
Chicopee . .	1	1	2
Danvers . .	1	–	1
Dartmouth . .	1	1	2
Dedham . .	2	–	2
Dighton . .	–	1	1
Dracut . .	–	1	1
Easton . . .	–	1	1
Everett . .	4	1	5
Fairhaven . .	1	–	1
Framingham .	1	–	1
Gardner . .	–	1	1
Gloucester . .	1	1	2
Greenfield . .	–	1	1
Groton . .	–	1	1
Haverhill . .	2	1	3
Holbrook . .	1	–	1
Holliston . .	–	1	1
Holyoke . .	1	–	1
Lawrence . .	3	–	3
Lee . . .	1	–	1
Lowell . . .	–	1	1
Lynn . . .	4	–	4
Malden . .	1	–	1
Medford . .	4	–	4
Medway . .	–	1	1
Melrose . .	1	1	2
Middleborough .	2	1	3
Milton . . .	1	–	1
Natick . . .	–	1	1
New Bedford .	3	5	8
Newburyport .	–	1	1
Newton . .	–	3	3
Northampton .	1	–	1
Palmer . .	–	1	1
Peabody . .	–	1	1
Pittsfield . .	1	–	1
Plymouth . .	1	–	1
Quincy . .	3	1	4
Randolph . .	1	–	1
Reading . .	1	–	1
Revere . . .	2	–	2
Rowley . .	–	1	1
Salem . . .	3	–	3
Somerville . .	5	2	7
Southbridge .	1	–	1
Springfield . .	3	–	3
Stoughton . .	–	1	1
Taunton . .	1	1	2
Wakefield . .	1	–	1
Waltham . .	1	2	3
Wareham . .	1	–	1
Watertown . .	3	1	4
Westfield . .	1	–	1
Weymouth . .	1	–	1
Wilbraham . .	–	1	1
Winthrop . .	1	1	2
Woburn . .	1	–	1
Worcester . .	1	1	2
Totals .	127	75	202

TABLE 6.—*Diagnosis on Admission*

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
One Lesion						
Tb. adenitis cervical	2	3	2	5	12	5.94
Tb. adenitis inguinal	–	–	–	1	1	.49
Tb. adenitis mesenteric . . .	1	–	1	2	4	1.98
Tb. ankle	–	–	2	–	2	.99
Tb. cecum	2	–	–	–	2	.99
Tb. elbow	–	–	–	1	1	.49
Tb. epididymitis	1	–	–	–	1	.49
Tb. femur	–	–	–	1	1	.49
Tb. fistula in ano	1	–	–	–	1	.49
Tb. hip	2	1	4	2	9	4.45
Tb. knee	1	2	3	1	7	3.46
Tb. nephritis	5	1	1	–	7	3.46
Tb. ophthalmia	–	5	1	4	10	4.95
Tb. peritonitis	1	11	1	2	15	7.42
Tb. sacro-iliac	1	2	1	–	4	1.98
Tb. shoulder	3	–	–	–	3	1.48
Tb. skin	1	–	–	1	2	.99
Tb. spine	12	6	3	7	28	13.86
Tb. greater trochanter . . .	1	–	–	–	1	.49
Tb. wrist	1	–	–	1	2	.99
	35	31	19	28	113	–
One Lesion with X-Ray Evidence of Hilum or Pulmonary Infection						
Tb. ankle, Hilum	–	–	–	1	1	.49
Tb. epididymitis, Pul. . . .	1	–	–	–	1	.49
Tb. fistula in ano, Pul. . . .	1	–	–	–	1	.49
Tb. hip, Pul.	1	–	–	–	1	.49
Tb. knee, Pul.	1	–	–	–	1	.49
Tb. nephritis, Pul.	1	–	–	–	1	.49
Tb. peritonitis, Pul. . . .	1	1	–	–	2	.99
Tb. spine, Pul.	–	1	–	–	1	.49
	6	2	–	1	9	–
Two Lesions						
Tb. adenitis axillary, Tb. breast	–	1	–	–	1	.49
Tb. adenitis cervical and axillary	1	2	–	–	3	1.48
Tb. adenitis cervical, Tb. peritonitis	1	–	–	–	1	.49
Tb. ankle, Tb. spine . . .	1	–	–	–	1	.49
Tb. appendix, Tb. cecum . .	–	1	–	–	1	.49
Tb. cystitis, Tb. nephritis .	–	2	–	–	2	.99

TABLE 6.—*Diagnosis on Admission*—(Concluded)

	Adults		Children		Totals	Percentages
	Males	Females	Males	Females		
Tb. epididymitis, bilateral	1	–	–	–	1	.49
Tb. epididymitis, Tb. orchitis	–	–	1	–	1	.49
Tb. epididymitis, Tb. wrist	1	–	–	–	1	.49
Tb. hip, Tb. nephritis	1	–	–	–	1	.49
Tb. hip, Tb. spine	2	–	–	1	3	1.48
Tb. knee, bilateral	1	–	–	–	1	.49
Tb. knee, Tb. spine	1	–	–	–	1	.49
Tb. nephritis, Tb. spine	2	–	–	–	2	.99
Tb. ophthalmia, bilateral	–	–	1	2	3	1.48
Tb. ophthalmia, Tb. adenitis cervical	–	–	1	1	2	.99
Tb. rectum, Tb. sigmoid	–	1	–	–	1	.49
Tb. sacro-iliac, Tb. spine	–	1	–	–	1	.49
Tb. shoulder, Tb. foot	–	–	1	–	1	.49
Tb. spine, Tb. Brodie's abscess greater trochanter	1	–	–	–	1	.49
Tb. spine, Tb. enteritis	1	–	–	–	1	.49
Tb. spine, Tb. hip	–	1	–	–	1	.49
Tb. spine, Tb. nephritis	2	–	–	1	3	1.48
Tb. spine, Tb. ophthalmia	–	–	1	–	1	.49
Tb. spine, Tb. wrist	1	–	–	–	1	.49
Tb. wrist, Tb. shoulder	1	–	–	–	1	.49
	18	9	5	5	37	–
Two Lesions with X-Ray Evidence of Pulmonary Infection						
Tb. adenitis cervical and axillary, Pul.	–	2	–	–	2	.99
Tb. elbow, Tb. adenitis cervical, Pul.	–	–	1	–	1	.49
Tb. nephritis, bilateral, Pul.	–	1	–	–	1	.49
Tb. spine, Tb. ankle, Pul.	–	1	–	–	1	.49
	–	4	1	–	5	–
Three Lesions						
Tb. adenitis cervical, axillary, and inguinal	1	–	1	–	2	.99
Tb. adenitis mesenteric and inguinal, Tb. spine	–	–	1	–	1	.49
Tb. epididymitis, bilateral, Tb. nephritis	2	–	–	–	2	.99
Tb. epididymitis, Tb. nephritis, Tb. knee	1	–	–	–	1	.49
Tb. hip, bilateral, Tb. abscess in inguinal region	–	–	–	1	1	.49
Tb. nephritis, Tb. hip, Tb. shoulder	1	–	–	–	1	.49
Tb. ophthalmia, bilateral, Tb. adenitis cervical	–	–	2	–	2	.99
Tb. peritonitis, Tb. adenitis, cervical and inguinal	–	–	1	–	1	.49
Tb. sacro-iliac, bilateral, Tb. spine	1	–	–	–	1	.49
Tb. spine, Tb. hip, Tb. wrist	1	–	–	–	1	.49
	7	–	5	1	13	–
Three Lesions with X-Ray Evidence of Pulmonary Infection						
Tb. bladder, Tb. nephritis, Tb. orchitis, Pul.	1	–	–	–	1	.49
Tb. adenitis cervical, Tb. ankle, Tb. spine, Pul.	–	1	–	–	1	.49
	1	1	–	–	2	–
Four Lesions						
Tb. adenitis cervical, axillary, and inguinal, Tb. ophthalmia	–	–	1	–	1	.49
Tb. peritonitis, Tb. adenitis inguinal, axillary, and cervical	–	–	1	–	1	.49
Tb. prostate, Tb. epididymitis, bilateral, Tb. pubis	1	–	–	–	1	.49
Tb. spine, Tb. hip, Tb. greater trochanter, Tb. elbow	–	1	–	–	1	.49
	1	1	2	–	4	–
Non-tuberculous						
Arthritis	–	–	1	–	1	.49
Abdominal disease	1	–	–	–	1	.49
Congenital anomaly of spine	–	–	1	–	1	.49
Enteritis	1	–	–	–	1	.49
Foot	–	–	–	1	1	.49
Malum coxae senile	–	1	–	–	1	.49
Mastoid and temporal bone	–	–	1	–	1	.49
Chronic osteomyelitis	2	–	–	–	2	.99
Polyarthritis	–	1	–	–	1	.49
Unclassified	2	3	2	2	9	4.45
	6	5	5	3	19	–

TABLE 7.—*Condition on Discharge*

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
Arrested	20	17	42	23	102	47.22
Apparently arrested	7	5	1	1	14	6.48
Quiescent	7	6	1	2	16	7.41
Improved	8	10	1	3	22	10.19
Unimproved	1	3	–	2	6	2.78
Deaths	9	10	7	2	28	12.96
Not considered	4	7	2	1	14	6.48
Non-tuberculous	4	3	3	4	14	6.48
	60	61	57	38	216	–

TABLE 8.—*Deaths*

DURATION OF DISEASE	ADULTS		CHILDREN		Totals	LENGTH OF RESIDENCE IN SANATORIUM				
						ADULTS		CHILDREN		Total
MONTHS	Males	Females	Males	Females		Males	Females	Males	Females	
Less than 1 month	–	–	–	–	–	2	1	–	–	3
1 to 2 months	–	–	–	–	–	–	3	1	–	4
2 to 3 "	–	–	–	–	–	2	–	–	–	2
3 to 4 "	–	–	–	–	–	–	–	–	–	–
4 to 5 "	–	–	–	–	–	1	1	–	–	2
5 to 6 "	–	–	–	–	–	–	1	–	1	2
6 to 7 "	1	1	1	–	3	–	–	–	–	–
7 to 8 "	1	–	–	–	1	–	1	–	–	1
8 to 9 "	–	–	–	–	–	–	–	–	–	–
9 to 10 "	–	–	–	–	–	–	–	1	–	1
10 to 12 "	–	–	–	–	–	2	–	–	–	2
12 to 18 "	3	1	–	1	5	2	–	–	–	2
18 to 24 "	–	–	–	–	–	–	–	–	–	–
Over 2 years	4	8	6	1	19	–	3	5	1	9
	9	10	7	2	28	9	10	7	2	28

TABLE 9.—*Causes of Death*

	ADULTS		CHILDREN		Totals
	Males	Females	Males	Females	
Tb. adenitis cervical, Tb. peritonitis, chronic myocarditis	1	–	–	–	1
Tb. cecum, acute miliary tuberculosis, pulmonary embolism	–	1	–	–	1
Tb. elbow, Tb. hip	–	1	–	–	1
Tb. hip, Tb. spine, status lymphaticus	–	–	–	1	1
Tb. knee	–	1	–	–	1
Tb. nephritis, pulmonary tuberculosis	1	–	–	–	1
Tb. nephritis, pulmonary tuberculosis, Amyloidosis	1	–	–	–	1
Tb. nephritis, Tb. bladder, Tb. orchitis, broncho-pneumonia	1	–	–	–	1
Tb. peritonitis, Tb. adenitis inguinal, axillary and cervical	–	–	1	–	1
Tb. peritonitis with fecal fistula	1	–	–	–	1
Tb. peritonitis, Tb. ophthalmia	–	1	–	–	1
Tb. sacro-iliac, Tb. adenitis cervical, broncho-pneumonia, amyloidosis	–	1	–	–	1
Tb. sacro-iliac, bilateral, amyloidosis	1	–	–	–	1
Tb. sacro-iliac, pulmonary tuberculosis, amyloidosis	–	1	–	–	1
Tb. sacro-iliac, Tb. spine, chronic parenchymatous nephritis	1	–	–	–	1
Tb. spine, amyloidosis	1	–	2	–	3
Tb. spine, Tb. ankle, Tb. meningitis	–	1	–	–	1
Tb. spine, acute peritonitis, amyloidosis	1	–	–	–	1
Tb. spine, chronic nephritis	–	1	–	–	1
Tb. spine, Tb. ophthalmia, status lymphaticus	–	–	1	–	1
Tb. spine, Tb. nephritis and cystitis, Tb. meningitis	–	1	–	–	1
Tb. spine, Tb. peritonitis, amyloidosis	–	–	1	–	1
Tb. spine, Tb. nephritis, Tb. bladder, acute dilation of stomach	–	–	1	–	1
Tb. spine, passive congestion of the lungs, toxemia	–	–	–	1	1
Tb. wrist, Tb. hip, Tb. larynx, pulmonary tuberculosis, amyloidosis	–	–	1	–	1
Broncho-pneumonia, primary anemia	–	1	–	–	1
	9	10	7	2	28

Financial Report, Lakeville State Sanatorium, 1933

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1933.

Statement of Earnings

Board of patients:			
Private	$3,958 00		
Cities and towns	120,306 50		
		$124,264 50	
Personal services:			
Reimbursement from Board of Retirement		$107 68	
Sales:			
Food	$71 27		
Furnishings and household supplies	11.40		
Medical and general care	67 24		
Farm	1,321 48		
Garage, stable and grounds	131 28		
Repairs, ordinary	2.25		
Miscellaneous—junk	10.50		
Total sales		$1,615 42	
Miscellaneous:			
Interest on bank balances	$55 23		
Total miscellaneous		$55 23	
Total earnings for the year			$126,042 83
Total cash receipts reverting and transferred to the State Treasurer			$120,324 32
Accounts receivable outstanding Dec. 1, 1932		$32,758 23	
Accounts receivable outstanding Nov. 30, 1933		38,476 74	
Accounts receivable increased			$5,718 51

Maintenance Appropriation

Balance from previous year, brought forward		$2,941 76
Appropriation, current year	$254,450 00	
		254,450 00
Total		$257,391 76
Expenditures as follows:		
Personal services	$158,075 96	
Food	29,078 51	
Medical and general care	10,935 56	
Farm	12,000 77	
Heat, light and power	9,809 07	
Garage, stable and grounds	1,401 96	
Travel, transportation and office expenses	3,184 19	
Religious instruction	1,290 50	
Clothing and materials	705 85	
Furnishings and household supplies	13,934 16	
Repairs, ordinary	2,480 50	
Repairs and renewals	3,177 95	
Grounds	791 12	
Total maintenance expenditures		$246,866 10
Balance of maintenance appropriation, Nov. 30, 1933		10,525 66
Estimated outstanding liabilities, Nov. 30, 1933		$5,108 19

Special Appropriations

Balance December 1, 1933, brought forward		$1,105 05
Appropriations for current year		0,000 00
Total		$1,105 05
Expended during the year (see statement below)	$678 65	
Reverting to Treasury of Commonwealth	* 426 40	
(Star balances below that are reverting)		1,105 05
Balance November 30, 1933, carried to next year		$0,000 00

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Alteration of two buildings	1931–1	$14,894 73.	–	$14,736 81	$157 94*
Alteration of two buildings (furnishings)	1931–1	2,105 25	$678 65	1,935 36	169 89*
Repairs and improvements	1931–1	5,700 00	–	5,601 43	98.57*
		$22,700 00	$678 65	$22,273 60	$426 40*

PER CAPITA

During the year the average number of patients has been		282.77
Total cost of maintenance	$246,866 10	
Equal to a weekly per capita cost of (52 weeks to year)	16 79	
Total receipts for the year	120,324 32	
Equal to a weekly per capita of	8.18	
Total net cost of maintenance for year (total maintenance less total receipts)		$126,541 78
Net weekly per capita	8.61	

Respectfully submitted,

FLORENCE D. MONROE,
Treasurer.

Inventory, Lakeville State Sanatorium

GRAND SUMMARY SHEET

November 30, 1933

REAL ESTATE

Land, 251.61 acres	$18,065 00	
Buildings	529,775 89	
Betterments (additions and improvements)	165,319 67	
Total, Real Estate		$713,160 56

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$324 38	
Food	4,619 31	
Clothing and materials	6 37	
Furnishings and household supplies	1,434 16	
Medical and general care	1,850 88	
Heat, light and power	630 74	
Farm	288 90	
Garage, stable and grounds	100 44	
Repairs	1,409 13	
Total		$10,664 31

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$2,120 86	
Clothing and materials	621 25	
Furnishings and household supplies	45,146 82	
Medical and general care	13,676 76	
Heat, light and power	82 90	
Farm	27,450 44	
Garage, stable and grounds	2,545 42	
Repairs	2,558 88	
Total		$94,203 33

GRAND SUMMARY

Real Estate, Total	$713,160 56	
Personal Property—Undistributed Supplies, Total	10,664 31	
Personal Property—Distributed Supplies, Total	94,203 33	
Grand Total		$818,028 20

NORTH READING STATE SANATORIUM

RESIDENT OFFICERS

CARL C. MACCORISON, M.D., *Sanatorium Superintendent.*
EARLE C. WILLOUGHBY, M.D., *Assistant Superintendent.*
GERALD H. CARON, M.D., *Assistant Physician.*
ANNA H. MAXWELL, M.D., *Assistant Physician.*
JAMES H. POWERS, D.M.D., *Dentist.*
ETHEL M. KNIGHT, *Institution Treasurer.*
ELLEN E. BENT, R.N., *Principal of School of Nursing.*
ELIZABETH HASLETT, *Head Housekeeper.*
BEULAH F. PHILBROOK, *Head School Teacher.*
J. ELLIS DOUCETTE, *Sanatorium Steward.*
DANIEL J. SCOTT, *Chief Power Plant Engineer.*
EDWARD J. LEARY, *Head Farmer.*

NON-RESIDENT OFFICERS

EDWARD D. CHURCHILL, M.D., *Consultant, Thoracic Surgeon.*
ZABDIEL ADAMS, M.D., *Consultant, Orthopedic Surgeon.*
HALSEY B. LODER, M.D., *Consultant, General Surgeon.*
HAROLD L. HIGGINS, M.D., *Consultant, Pediatrician.*
THOMAS ODONEAL, M.D., *Consultant, Ophthalmologist.*
CHARLES W. DEWOLFE, M.D., *Consultant, Laryngologist.*

Report of the Superintendent

To HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor of submitting the twenty-third annual report of the North Reading State Sanatorium for the year ending November 30, 1933.

FINANCIAL STATEMENT

During the year there has been expended for maintenance $214,300.82, a gross weekly per capita cost of $14.80. There has been expended from Special Appropriations authorized by Chapters 115 and 170, Acts of 1930–1932, for "Employees' Building", the sum of $40.07; Chapter 69, Act of 1932, for "Certain Filter Beds," the sum of $638.42.

There has been collected from miscellaneous sources $79,193.92 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of $135,160.90. The net weekly per capita cost was $9.63. There has been collected from private funds $4,064; from cities and towns, $74,333. Twenty-two cases (including 12 from the Division of Child Guardianship) were supported by private funds; 445 by cities and towns and 86 wholly by the State.

POPULATION

There were 281 patients at the beginning of the fiscal year and 269 at the close. The largest number present at any one time was 284 and the smallest number present at any one time was 258. The daily average number of patients was 269.95 as against 271.40 last year. There were 265 patients admitted during the year, six less than last year.

There were 198 cases admitted from cities and towns of over 25,000 population, and 67 cases from cities and towns under 25,000 population. The average age of patients was 9.32—a little above last year. Including deaths, there were 277 cases discharged, and the average duration of residence was 12 months and 10 days. Of those discharged, 237 gained 29,680 lbs. an average gain of 12.10 lbs. per person.

Of the discharges, there were 24 apparently well, 125 arrested, 55 apparently arrested, 4 quiescent, 19 improved, 22 unimproved, 14 not considered, the duration of treatment being less than thirty days. There were 16 deaths, 3 more than last year.

There were 98,548 hospital days.

Average number of officers and employees: Males, 55.54. Females, 74.22. Total 129.76.

MEDICAL REPORT

There has been practically no change in methods of treatment the past year. We are stressing prolonged bed rest more and more, not only for the pulmonary type but for the childhood type, who are placed in Group 4. At the end of the fiscal year, 80 of the 269 cases showed the adult type disease; 33 of these, however, had the inactive type of disease and the majority were attending school.

At the end of the year, 15 patients were receiving pneumothorax treatment. Twenty-eight children in all received artificial pneumothorax treatment during the year and 342 refills were given. Pneumolysis was performed on 2 patients at the Massachusetts General Hospital.

Although the majority of the children receiving collapse therapy show some improvement, it is altogether too early to judge as to the direct benefits of this form of treatment in this younger age group.

It is gratifying to state that the work in both the consultation and out-patient clinics has increased over that of a year ago. In the out-patient clinics 1,145 patients were seen and 234 examinations were made in the consultation clinics held in Lawrence and Haverhill.

Dr. Olive A. Cooper, our consultant from the Department of Mental Diseases, held 10 clinics at the sanatorium and examined 37 children. We still feel that the services rendered by Dr. Cooper and her associates are of inestimable value.

Nine eye, ear, nose and throat clinics were held by our consultants, Doctors Odoneal and DeWolfe. One hundred and thirteen children were referred to these clinics, 51 were fitted to glasses, and tonsils and adenoids removed from 14 patients. In addition to these clinics, Dr. Harold L. Higgins, of the Massachusetts General Hospital, our Consultant in Pediatrics, and Dr. Edward Churchill, our Consultant in Chest Surgery, held various clinics throughout the year.

During the past year we have had 32 cases of mumps, 29 cases of whooping cough and 8 cases of chicken pox.

All children have had the Dick test and those found positive were given toxoid for the purpose of immunizing against scarlet fever. It is very gratifying to note that there have been no cases of scarlet fever during the past year and a half.

During the winter months 48 employees and 90 patients were sent to the hospital suffering with respiratory infection, which was diagnosed as "grippe."

The affiliate course of three months in Pediatrics and Aseptic Technique for nurses has been continued. This course consists of fifteen lectures in pediatrics, six in infant feeding and two in dentition. Lectures are given by the medical staff, by the principal of the school of nursing, and a specially trained hospital supervisor, who has charge of our contagious wards.

INSTITUTIONAL ACTIVITIES

The following programs, consisting of lectures, clinics, etc., were held at the sanatorium:

January 17, 1933: Annual meeting of the Southern Middlesex Health Association.
February 7, 1933: Training School of the Malden City Hospital.
March 16, 1933 and March 23, 1933: Special class of Dr. Robert H. Nichols (Post-graduate Course).
April 14, 1933: Senior class of the New England Sanatorium Training School.
August 21, 1933: Dr. Harold L. Higgins of the Massachusetts General Hospital and his class in pediatrics.
November 28, 1933: Training School of the New England Sanatorium.

PERSONNEL

Dr. Ebenezer K. Jenkins was appointed as temporary Assistant Physician on August 3, 1933, serving until December 5, 1933.

There has been no change in our staff of consultants.

IMPROVEMENTS AND CHANGES

The old farmhouse, wagon shed, stable, coal shed, and Camp I East were re-shingled during the year.

Our old silent projector was replaced by a talking picture equipment.

A new lubricating system for the engine and generators was installed.

RECOMMENDATIONS

The old engines, which by the way are all secondhand, are very much in need of extensive repair work. I strongly recommend that $1,200 be appropriated for this purpose.

The Engineering Division has recommended an appropriation for the further extension of the water supply and irrigation system; also the installation of additional sprinkler heads.

Some type of garage should be erected to house the twenty odd cars owned by employees, which are scattered hither and yon about the grounds.

The remaining sections of the old wooden verandas on Pavilions B West and C East should be replaced by cement verandas.

The water lines in the school house, which are pretty much occluded by rust should be replaced.

ACKNOWLEDGMENT

The Rev. Father Brandley and his assistants, the Rev. J. L. McCorison, the Rev. George H. Gage, the Rev. Warren Landers and Rabbi Zeldner have again served the spiritual needs of our patients. They have brought good cheer and courage to those who are so much in need of encouragement, and have been of great assistance in maintaining the happiness and morale of our patients.

To the many friends of the Institution, who have contributed so generously to the happiness and pleasure of the children, I am deeply indebted, especially to the Highland Lassie Band and members of the Boston Caledonian Club, who year after year have given so freely of their time and talent.

I also wish to extend my thanks to the Reading High School Band and North Reading Legion Band for providing band concerts at the Sanatorium.

To the medical staff, heads of departments and employees I am deeply indebted for their loyalty and cooperation. Joseph Sherry, watchman, and George Watson, baker, were retired during the year, having reached the age limit of seventy years.

LABORATORY REPORT

The following examinations were made in our laboratory:

Sputum examinations: Positive	218	
Negative	709	927
Urine analyses		1,912
White blood counts		133
Red blood counts		50
Differential blood counts		129
Babcock tests for milk		42
Bacterial plate counts for milk		42
Throat cultures		46
Other cultures and smears		68
Widal tests		74
Fragility tests		0
Spinal fluids		6
Blood coagulation tests		5
Posture pictures taken and developed and printed		367

DENTAL REPORT

The following table is a summary of the work done during the year:

Prophylactic treatments	684
Fillings (permanent teeth)	624
Fillings (temporary teeth)	392
Extractions (permanent teeth)	395
Extractions (temporary teeth)	789
Treatments	305
Restorations	4
X-Rays	262
Irrigations	310
Visits	2,662
New patients	280
Dismissals	317

SCHOOL REPORT

During the summer vacation, Miss Mary C. Marks, the kindergarten teacher in the training school of Bridgewater State College, gave two weeks of her time to the interest of kindergarten in the sanatorium. She stressed very emphatically the importance of this training for this group of small children. However, she felt that it was not advisable to expect an attendant to conduct kindergarten activities. So much time is required to prepare materials, the work could not be done efficiently under those conditions. Each child should receive new projects and advanced work as quickly as he is able to grasp them. Otherwise lazy school habits are established and kindergarten becomes a handicap instead of giving the individual child the wide experience and wealth of material that make a firm foundation for the whole school career.

Effort has been made this year to enrich the high school curriculum. By alternating with Miss Hoffman, Miss LaBonte has been able to teach a class in elementary French. Bookkeeping has also been added. Correspondence courses in business English and plane geometry are being carefully supervised. If the home schools will not accept correspondence credits as points for graduation, we are trying to have these pupils so well prepared that they will be able to pass examinations and earn the points in this way.

Some of the more active children find it very difficult to adjust to hospital routine. Thus they not only do not take proper treatment themselves, but they prevent others from doing so. For this group the extra-curricula department is particularly beneficial.

The new lathe and jigsaw are a great help to the third and fourth groups of boys. With the aid of these machines, these boys, who are not able to use many of the hand tools, may make many useful articles.

With the opening of the fall term, we had an unusually large number of children in the fifth and sixth grades. The room which they occupy was built to accommodate about thirty pupils. At present we are trying to crowd twice that number into it. With our present personnel we cannot improve this situation. It is impossible for the teachers to do good work under these abnormal conditions.

School Statistics

	Average Daily Attendance	Per Cent of Attendance	Total Enrollment
Grade I	23.96	91.09	37
Grade II	21.44	95	62
Grades III and IV	36	94	78
Grades V and VI	41.37	96.90	86
Grades VII and VIII	26.10	96	70
High School	16.46	95	41

Average daily attendance for school 165.33
Per cent of attendance for school 94.65
Total enrollment for school . . . . 374.

Respectfully submitted,

CARL C. MACCORISON, M.D.
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium Dec. 1, 1932	135	146	281
Patients admitted from Dec. 1, 1932, to Nov. 30, 1933, incl.	129	136	265
Patients discharged from Dec. 1, 1932, to Nov. 30, 1933, incl.	124	153	277
Patients remaining in Sanatorium Nov. 30, 1933	140	129	269
Daily average number patients	134.95	135.00	269.95
Deaths (included in number discharged)	9	7	16

TABLE 2.—*Classification on Application Blanks and on Admissions.*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1932	1933	1932	1933	1932	1933
Minimal	47	30	22	10	8.12	3.77
Moderately advanced	33	24	13	16	4.80	6.04
Advanced	3	17	8	26	2.95	9.81
Childhood type tuberculosis	152	165	172	165	63.47	62.26
Malnutrition	0	0	21	14	7.74	5.28
Pleurisy with effusion	2	1	0	0	–	–
Bronchiectasis	0	0	2	3	.74	1.13
Acute bronchitis	0	0	0	1	–	.38
Empyema	0	1	0	1	–	.38
Lung abscess	0	0	1	1	.37	.38
Tuberculosis of meninges	0	0	1	0	.37	–
Pulmonary tuberculosis	4	2	0	0	–	–
Observation	11	14	0	0	–	–
Deferred	0	0	8	5	2.95	1.89
Tuberculous cervical adenitis	0	1	1	0	.37	–
Nephritis	0	0	1	0	.37	–
Broncho pneumonia	0	0	2	0	.74	–
Pyo pneumothorax	0	0	0	1	–	.38
Convalescent pyo pneumothorax	0	0	0	1	–	.38
Glandular tuberculosis	0	1	0	0	–	–
Convalescent pneumonia	0	0	0	1	–	.38
Atelectasis	0	0	0	1	–	.38
Bronchial asthma	0	0	0	1	–	.38
Tuberculosis of spine	0	0	0	1	–	.38
No disease	0	0	15	13	5.53	4.90
Unclassified	19	9	4	4	1.48	1.50
	271	265	271	265		

Table 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	129	136	265
Total	129	136	265

Table 4.—*Age of Patients Admitted*

	Males	Females	Totals	Per Cent
Under 5 years	24	14	38	14.3
5 to 9 years	50	47	97	36.6
10 to 14 years	47	60	107	40.3
15 to 19 years	8	15	23	8.8
20 years and over	0	0	0	–
Average age	8.99	9.62	9.32	–
Total	129	136	265	100.00

Table 5.—*Nativity and Parentage of Patients Admitted*

Place of Nativity	Males			Females			Total		
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:									
Massachusetts	114	57	54	116	41	52	230	98	106
Other New England States	7	12	12	7	11	10	14	23	22
Other States	1	9	7	7	14	8	8	23	15
	122	78	73	130	66	70	252	144	143
Other Countries:									
Armenia	0	1	1	0	0	0	0	1	1
Australia	0	0	0	0	0	2	0	0	2
Austria	0	0	1	0	0	1	0	0	2
Azores	0	0	0	0	4	4	0	4	4
Barbados	0	0	0	0	1	1	0	1	1
Canada	1	11	16	3	18	20	4	29	36
Cape Verde	0	0	0	0	1	0	0	1	0
England	1	3	2	0	3	1	1	6	3
Finland	0	1	1	0	2	1	0	3	2
France	3	0	3	2	1	2	5	1	5
Germany	0	2	1	0	0	1	0	2	2
Greece	0	1	1	0	5	5	0	6	6
Ireland	1	2	2	0	5	7	1	7	9
Italy	0	18	14	0	12	5	0	30	19
Lithuania	0	1	0	0	0	1	0	1	1
Newfoundland	0	4	5	1	3	3	1	7	8
Poland	0	0	2	0	4	4	0	4	6
Portugal	0	0	0	0	3	3	0	3	3
Russia	0	1	1	0	7	4	0	8	5
Scotland	1	4	4	0	0	1	1	4	5
Sweden	0	1	1	0	0	0	0	1	1
Syria	0	1	1	0	0	0	0	1	1
Unknown	0	0	0	0	1	0	0	1	0
Total Foreign	7	51	56	6	70	66	13	121	122
Grand Total	129	129	129	136	136	136	265	265	265

Table 6.—*Residence of Patients Admitted*

Amesbury	4	Haverhill	8	Methuen	1	Salem	2
Andover	1	Holden	1	Milford	4	Sharon	3
Arlington	9	Hudson	4	Millis	1	Somerville	8
Belmont	1	Lawrence	10	Milton	1	Southbridge	1
Boston	67	Leominster	1	Natick	1	Stoneham	2
Braintree	1	Lexington	1	New Bedford	2	Stoughton	2
Cambridge	28	Lowell	1	Newburyport	5	Wakefield	1
Chelmsford	1	Lynn	7	Newton	4	Waltham	4
Chelsea	2	Malden	12	Norwood	2	Watertown	2
Concord	1	Marblehead	1	Peabody	3	Weymouth	3
Dracut	2	Marlborough	1	Quincy	16	Wilmington	1
Duxbury	1	Maynard	5	Reading	3	Winthrop	1
Everett	4	Medford	11	Revere	1	Woburn	2
Gloucester	1	Melrose	2	Rockport	1	Total	265

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Childhood tuberculosis	86	79	165	62.26
Minimal	4	6	10	3.77
Moderately advanced	11	5	16	6.04
Advanced	4	22	26	9.81
Malnutrition	8	6	14	5.28
No disease	6	7	13	4.90
Chronic lung abscess	0	1	1	.38
Bronchiectasis	1	2	3	1.13
Acute bronchitis	1	0	1	.38
Bronchial asthma	0	1	1	.38
Atelectasis	1	0	1	.38
Chronic empyema	1	0	1	.38
Convalescent pneumonia	1	0	1	.38
Pyo-pneumothorax	0	1	1	.38
Convalescent pyo-pneumothorax	0	1	1	.38
Tuberculosis of spine	1	0	1	.38
Unclassified	1	3	4	1.50
Deferred	3	2	5	1.89
Total	129	136	265	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently well	13	11	24	8.66
Arrested	66	59	125	45.12
Apparently arrested	13	40	53	19.13
Quiescent	1	3	4	1.44
Improved	8	11	19	6.89
Unimproved	6	16	22	7.94
Died	9	7	16	5.77
Not considered	8	6	14	5.05
Total	124	153	277	100.00

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month	0	0	0	5	1	6
1 to 2 months	2	0	2	0	2	2
2 to 3 months	2	0	2	0	1	1
3 to 4 months	0	0	0	1	0	1
4 to 5 months	0	0	0	0	0	0
5 to 6 months	0	0	0	1	0	1
6 to 7 months	0	0	0	0	0	0
7 to 8 months	0	0	0	1	0	1
8 to 9 months	0	0	0	1	0	1
9 to 10 months	0	0	0	0	0	0
10 to 11 months	1	1	2	0	0	0
11 to 12 months	1	0	1	0	0	0
12 to 18 months	1	1	2	0	1	1
18 to 24 months	1	1	2	0	1	1
Over 2 years	1	4	5	0	1	1
Total	9	7	16	9	7	16

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Tuberculosis of lungs	6	6	12
Tuberculosis of meninges	1	1	2
Tuberculosis of lungs and kidneys	1	0	1
Tuberculosis of lungs, tuberculous peritonitis and tuberculous enteritis	1	0	1
Total	9	7	16

Financial Report, North Reading State Sanatorium, 1933

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1933.

STATEMENT OF EARNINGS

Board of patients:			
Private	$3,926 00		
Cities and towns	77,446 00		
		$81,372 00	
Personal services:			
Reimbursement from Board of Retirement		100 24	
Sales:			
Clothing and materials	$18 00		
Furnishings and household supplies	189 68		
Medical and general care	40.55		
Heat, light and power	179 65		
Garage, stable and grounds	23.70		
Repairs, ordinary	67 79		
Repairs and renewals	5.00		
Miscellaneous — Junk	32.19		
Total sales		$556 56	
Miscellaneous:			
Rents	$98.49		
Prizes on chickens	11 50		
Total, miscellaneous		$109 99	
Total earnings for the year			$82,138 79
Total cash receipts reverting and transferred to the State Treasurer			79,139 92
Accounts receivable outstanding Dec. 1, 1932		$23,713 95	
Accounts receivable outstanding Nov. 30, 1933		26,712 82	
Accounts receivable increased			2,998 87

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$4,264 38
Appropriation, current year	$215,950 00	
		215,950 00
Total		$220,214 38
Expenditures as follows:		
Personal services	$138,308 06	
Food	31,142 01	
Medical and general care	6,573 55	
Farm	2,533 60	
Heat, light and power	11,193 73	
Garage, stable and grounds	1,058 30	
Travel, transportation and office expenses	2,597 58	
Religious instruction	1,483 73	
Clothing and materials	2,162 77	
Furnishings and household supplies	5,322 53	
Repairs, ordinary	2,802 38	
Repairs and renewals	2,632 10	
Total maintenance expenditures		$207,810 34
Balance of maintenance appropriation, Nov. 30, 1933		12,404 04
Estimated outstanding liabilities, Nov. 30, 1933		$5,050 98

SPECIAL APPROPRIATIONS

Balance December 1, 1933, brought forward		$4,020 73
Appropriations for current year		00,000 00
Total		$4,020 73
Expended during the year (see statement below)	$694 65	
Reverting to Treasury of Commonwealth	* 205 67	
(Star balances below that are reverting)		900 32
Balance November 30, 1933, carried to next year		$3,120 41

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Employees' Building	115–1930 170–1932	$75,000	$40.07	$72,406 08	$2,593 92
Improvement, water supplies	115–1930 245–1931	42,700	16.16	42,621 47	78.53*
Admission and Isolation Building	146–1929	172,000	–	171,873 29	126 71*
Repairs and improvements	245–1931	8,600	–	8,599 57	.43*
Certain Filter Beds	69–1932	17,000	638.42	116,473 51	526 49
		$315,300	$694 65	$311,973 92	$3,326 08

PER CAPITA

During the year the average number of patients has been		269 95
Total cost of maintenance	$207,810 34	
Equal to a weekly per capita cost of (52 weeks to year)	14.804	
Total receipts for the year	79,139 92	
Equal to a weekly per capita of	5.638	
Total net cost of maintenance for year (total maintenance less total receipts)		$128,670 42
Net weekly per capita	9.166	

Respectfully submitted,

ETHEL M. KNIGHT,
Treasurer.

Inventory: North Reading State Sanatorium

GRAND SUMMARY SHEET

November 30, 1933.

REAL ESTATE

Land, 101.75 acres	$8,565 00	
Buildings	656,974 36	
Betterments (additions and improvements)	146,632 64	
Total, Real Estate		$812.172 00

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$178 40	
Food	2,913 68	
Clothing and materials	2,947 68	
Furnishings and household supplies	2,903 56	
Medical and general care	513 38	
Heat, light and power	1,335 69	
Farm	289 11	
Garage, stable and grounds	63 81	
Repairs	125 06	
		$11,270 37

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$6,179 66	
Clothing and materials	610 91	
Furnishings and household supplies	68,962 13	
Medical and general care	10,609 79	
Heat, light and power		
Farm	11,442 42	
Garage, stable and grounds	7,034 23	
Repairs	7,567 50	
Total		$112,406 64

GRAND SUMMARY

Real Estate — Total	$812,172 00
Personal Property — Undistributed Supplies, Total	11,270 37
Personal Property — Distributed Supplies, Total	112,406 64
	$935,849 01

RUTLAND STATE SANATORIUM

RESIDENT OFFICERS

ERNEST B. EMERSON, M.D., *Superintendent.*
PAUL DUFAULT, M.D., *Assistant Superintendent.*
ARMAND LAROCHE, M.D., *Senior Physician.*
GABRIEL NADEAU, M.D., *Senior Physician.*
CHARLES K. MCCARTHY, M.D., *Assistant Physician.*
ISRAEL KAHALAS, M.D., *Assistant Physician.*
RUBY DELPHINA MCCARTHY, M.D., *Assistant Physician.*
GULLI LINDH MULLER, M.D., *Assistant Physician (Pathologist).*
DELYA E. NARDI, R.N., *Principal of the School of Nursing.*
RENA BLANCHE NAUSS, R.N., *Assistant Principal of the School of Nursing.*
MARGUERITE MCNAMARA, *Dietitian.*
OLIN C. BLAISDELL, *Steward.*
MARY A. BOYLE, *Institution Treasurer.*
HARRY U. WENDELL, *Chief Power Plant Engineer.*
JOSEPH A. CARROLL, *Head Farmer.*
NORA G. O'CONNELL, *Head Housekeeper.*

NON-RESIDENT OFFICERS

FRANK H. WASHBURN, M.D., *Senior Physician, Surgeon.*
EDWARD D. CHURCHILL, M.D., *Senior Physician, Surgeon.*
G. ARNOLD RICE, M.D., *Senior Physician, Bronchoscopist.*
WILLIAM J. O'CONNOR, D.M.D., *Dentist.*

Report of the Superintendent

TO HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the thirty-seventh annual report of the Rutland State Sanatorium for the year ending November 30, 1933.

FINANCIAL STATEMENT

During the year there has been expended $275,502.56 for maintenance, a gross weekly per capita cost of $15.51. There has been expended from Special Appropriation authorized by Chapter 170, Acts 1932, X-Ray equipment, $7,179.70.

There has been collected from miscellaneous sources (the total of all collections) $191,415.86, a decrease of 13.19 per cent under the collection of last year. Deducting this amount from the gross maintenance expense leaves a net expense of $84,187.70, a net weekly per capita cost of $4.73. There has been collected from private sources $27,939.00, the largest collection since 1925; from cities and towns $88,842.60; from Worcester County $43,265.00 and from Middlesex County, $30,092.50.

One hundred and eight cases were supported wholly or in part from private funds; eighty-three cases by cities and towns; eighty-two wholly by the State; forty-seven by the Tubercular Hospital District of Chelsea, Revere and Winthrop, and three by Worcester County. There were forty cases on which settlement had not been determined.

POPULATION

There were 368 patients in the sanatorium at the beginning of the year and 360 at the close. The largest number present at one time was 373 and the smallest 305. The daily average number of patients was 341.56, a decrease of 8.84 from last year. There were 357 patients admitted during the year, 36 less than last year; 34 minimal, 144 moderately advanced, 152 far advanced, 10 unclassified, 5 childhood type, 2 bronchiectasis, 4 tuberculous pleurisy, 2 nontuberculous, 2 lung abscess, 1 empyema and 1 Hodgkin's disease. There were 239 admitted from cities and towns of over 25,000 population and 118 from cities and towns under 25,000 population. The average age of patients admitted was 30.93, an increase of .07. Including deaths, there were 365 patients discharged, 35 more than last year. The average duration of residence was 387 days, 40 more than last year. Of those discharged, 208 gained 2,263¼ pounds, an average gain of 10.88 pounds per person. Of the discharged, there were 3 arrested cases, the same number as last year; 10 apparently arrested cases, 1 more than last year; 160 quiescent cases, 35 more than last year; 52 improved; 63 unimproved; 10 not considered, the duration of treatment being less than one month. There were 4 discharged nontuberculous. There was 1 on which no diagnosis was made. There were 62 deaths, 17 less than last year. There were 124,669 days of treatment, 3,578 days less than last year.

Average number of employees and officers during the year: males 120.80, females 81.74, total 202.54.

Further statistical details are shown in the tables which are a part of this report.

MEDICAL REPORT

During the year consultation clinics have been held in Gardner, Milford, Framingham, Clinton, Athol, Southbridge and Orange. The clinic at Framingham was discontinued in January, 1933, and the clinic at Clinton in September, 1933. These clinics have been replaced by a clinic in Athol and in Southbridge.

A pathological service has been established with a full-time pathologist.

The following papers have been published by the staff during the year:

"What We Have Learned from Five Hundred Spinal Anesthesias," Frank H. Washburn, M.D. *New England Journal of Medicine*, (209:345–348—August 17, 1933).

"Primary Carcinoma of Bronchus," G. Arnold Rice, M.D., *New England Journal of Medicine* (209: 341–345—August 17, 1933).

"Prolonged Bed Rest in Pulmonary Tuberculosis," Paul Dufault, M.D., *New England Journal of Medicine*, (209: 184–188—July 27, 1933).

The following papers have been prepared during the year but are not yet published.

"Bronchopulmonary Suppuration," Ernest B. Emerson, M.D.

"Oleothorax With Report of Cases," Charles K. McCarthy, M.D.

"Evolution of Pneumothorax Therapy," Armand Laroche, M.D.

"Bilateral Pneumothorax," Gabriel Nadeau, M.D.

INSTITUTIONAL ACTIVITIES

The Training School is in its twenty-sixth year.

Lectures and demonstrations have been given by the medical staff and special instruction by the following: Mrs. Helen Hackett, Public Health Nursing; Dr. Nels A. Nelson, Gonorrhea and Syphilis; Dr. Oscar A. Dudley, Communicable Diseases, Prevention and Treatment; Miss Frederica Beinert, Nutrition.

The hospital affiliations are:

Cooley-Dickinson Hospital	8 months
Boston City Hospital	12 months
Boston Floating Hospital	3 months
North Reading State Sanatorium	3 months

Graduation exercises were held October 16, 1933. The address was given by Dr. M. Luise Diez, Division of Child Hygiene, Department of Public Health.

The following were awarded diplomas:

Ruby Carr Choquette
Marie K. Boucher
Stephanie Serwatka
Cecelia Matta
Edna Morris
Catherine Irene O'Connell
Evelyn Sanborn
Ella Connor Bird

The following have been awarded diplomas after completing the six months' postgraduate course: Ruth Bennett and Mildred Feeney, graduates of the Rhode Island General Hospital, Providence, Rhode Island; Margaret F. DeCourcy, a graduate of the Worcester City Hospital, Worcester, Massachusetts; Annie J. Goodrich, a graduate of the Hahnemann Hospital, Worcester, Massachusetts.

There are 36 student nurses: 10 seniors, 13 juniors and 13 preliminaries.

There have been two meetings of the Worcester District Medical Society at the sanatorium. At one of these meetings a symposium on collapse therapy was presented by the medical staff.

There has been one meeting of the Dental Study Club.

Dr. Robert H. Nichols, assisted by the members of the staff, conducted two postgraduate clinics.

PERSONNEL CHANGES

Another year has passed with no resignations or vacancies on the medical staff. This continuity of service is reflected in the amount and quality of the medical work done during the year.

Dr. Gulli Lindh Muller, a graduate of the College of Physicians and Surgeons, Columbia University, and recently, assistant physician at the Thorndike Memorial Laboratories, Boston City Hospital, was appointed to the new position, assistant physician (pathologist) October 16, 1933.

Following the retirement of Miss Cora E. Phillips, Mrs. Nora G. O'Connell was appointed head housekeeper.

IMPROVEMENTS AND CHANGES

The installation of a centralized radio system mentioned in last year's report has been completed. An extension from the Assembly Hall makes it possible to broadcast lectures and entertainments to the bed patients.

Extensive repairs have been done on the old farmhouse and on the trestle and railroad siding.

A milking machine has been installed in the dairy.

The old ice house and Bartlett barn have been taken down during the past year and a wagon shed built from the salvaged material, under the direction of the head farmer during spare time.

RECOMMENDATIONS

I am again calling attention to the very much overcrowded condition of the staff dining room, and I recommend an appropriation of $1,700 for an extension on the east side.

I am also again recommending repairs and remodeling of the present piggery to facilitate earlier breeding in order that the young pigs may come in February and March and mature sufficiently to be turned out earlier in the spring. Whatever time for pasture feeding is made available supplements the garbage from the sanatorium and is a profitable investment. I recommend $1,100 for this purpose.

I endorse the recommendation of the Division of Sanitary Engineering to lay a six-inch cast-iron water pipe for the farm buildings and the installation of three hydrants for $3,500. I also endorse the recommendation of the Division of Sanitary Engineering for further fire protection by the addition of sprinklers to the attics and other unprotected places for the sum of $3,500.

I recommend an appropriation of $11,400 for the building of a surfaced road beginning at Central Tree Road and extending from there around the east side of the institution to a point about opposite the bakery and a branch extending to Ward E and by the Administration Building around the circle.

The pressure on two boilers has been cut down and I recommend an appropriation of $35,000 to replace these with oil burning equipment.

ACKNOWLEDGMENTS

Miss Cora E. Phillips, head housekeeper, was retired July 19, 1933, after thirty-three years' continuous service. Miss Margaret Loynachan, head nurse, was retired July 18, 1933, after twenty-eight years' continuous service. The years of service and the loyalty of both these women are of more than passing interest, extending over the administration of four superintendents prior to my appointment, and I have personal knowledge of the regard held for them by my predecessors. I wish to bear witness to their loyalty and devotion to the work during my administration. Such employees make possible the smooth running and the morale of an institution.

The Reverend Father McNamara, the Reverend Robert French, the Reverend Father Smith and Rabbi Zeldner have again served for the spiritual needs of another year.

The medical staff, nurses and employees have given me, as usual, their loyalty, support and cooperation for which I am deeply grateful.

In closing I wish to express my appreciation of your confidence and support.

Respectfully,

ERNEST B. EMERSON, M.D.
Superintendent.

SURGICAL REPORT

The following is a list of the surgical operations performed at the sanatorium:

Appendectomy	18
Webster-Baldy operation	1
Exploration and curettage	2
Dilatation and curettage	2
Incision and curettage of chalazion	1
Herniotomy	3
Perinorrhaphy	1
Removal of hydrocele	1
Cholecystectomy	1
Cholecystostomy	1
Phrenicectomy	37
Phrenicotomy	7
Pneumolysis	75
Thoracoscopy	2
Thoracotomy	3
Cystoscopy	24
Exploratory laparotomy	1

SURGICAL REPORT—*Concluded*

Tonsillectomy	9
Adenectomy	2
Bronchoscopy	103
Biopsy	3
Thyroidectomy	2
Mastoidotomy	1
Removal of bone from septum	2
Total	302
Oleothorax cases	6
Oleothorax treatments	56
Artificial pneumothorax cases	251
Artificial pneumothorax cases (Out-patient)	32
Artificial pneumothorax treatments	4,839
Aspirations (chest)	90
Lumbar punctures	5

There were 13 thoracoplasties performed at the Massachusetts General Hospital.

LABORATORY

Urine examinations:	
Routine	723
Microscopic	725
Qualitative sugar determination	3,853
Quantitative sugar determination	214
Acetone	3,858
Benzidin test for occult blood	54
Mosenthal test	8
Kidney function test	14
Bile	11
Sputum examinations:	
Routine for tubercle bacilli	5,916
Concentration method for tubercle bacilli	15
Blood examinations:	
Cultures	3
Red cell count	494
White cell count	969
Differential count	912
Hemoglobin determination	506
Schilling index	79
Icterus index	63
Hematocrit	76
Reticulated red cell count	77
Coagulation time	149
Bleeding time	2
Erythrocyte sedimentation test	547
Van den Bergh test	2
Sugar determination (Folin's method)	81
Urea nitrogen	8
Widal reactions	147
Calcium determination	1
Feces examinations:	
Benzidin test for occult blood	12
Ova, tubercle bacilli, etc.	9
Pleural fluid examinations:	
Culture	25
Smear	18

Spinal fluid examinations:	
Cell count	4
Gastric analysis	2
Differentiation of bacteria:	
Culture	50
Smear	106
Guinea pig inoculations and autopsies	95
Milk examinations:	
Bacteria count	58
Percentage of fat	112
Water examinations:	
Bacteria count	48
B. coli	72
Preparation of autogenous vaccine	2
Cultures for B. typhosus:	
Urine	51
Feces	53
Spinal fluid drawn for Wassermann test	3
Spinal fluid drawn for Gold Sol. test	2
Blood drawn for Hinton and Wassermann tests	362
Total number of examinations	20,591

Twenty-four lectures in bacteriology were given to nurses at the training school.

Of the total number of patients in the sanatorium November 30, 1933, 77.9 per cent (360) had a positive sputum; 4.1 per cent reported no sputum; tubercle bacilli were not found in 18 per cent. Of the total number of patients whose sputum was examined 81.1 per cent were positive.

Smallpox vaccinations	225
Typhoid and Paratyphoid A and B inoculations	208

X-Ray plates of chest, stomach, etc.	2,052	
Dental X-Ray	212	
Total X-Rays		2,264

The following tables indicate the work of the consultation service, clinics, out-patient and others:

Consultation Clinics:

Number of patients examined at the Gardner, Milford, Framingham, Clinton, Athol, Southbridge and Orange clinics, 531.

Diagnosis:

Tuberculosis	60	Childhood type	52
Non-tuberculous	156	Bronchiectasis	3
Observation	260		

Consultation cases to the number of 531 (183 more than last year) were reported for 606 examinations (223 more than last year), and 28 ex-patients (7 more than last year) reported for 35 follow-up examinations (1 more than last year), making a total of 641 examinations (224 more than last year) at the consultation clinics.

Number of patients examined once, 461; twice, 59; three times, 8; four times, 3.

Number of ex-patients examined once, 22; twice, 5; three times, 1.

Number of physicians referring patients, 108 (14 more than last year).

There was 1 patient admitted to the sanatorium following examinations at the consultation clinics.

Sanatorium Out-Patient Clinic:

Patients referred by physician	278
Patients examined at own request	125
	403
Ex-patients examined at own request	114
Total	517

Diagnosis:

Tuberculosis	47	Childhood type	30
Non-tuberculous	128	Tuberculous Pleurisy	1
Observation	132	Bronchiectasis	2
			340

This year 340 patients (46 more than last year) reported for 367 examinations (47 more than last year), and 159 ex-patients (52 more than last year) reported for 207 examinations (66 more than last year), making a total of 574 examinations at the sanatorium.

Number of patients examined once, 317; twice, 20; three times, 2; four times, 1.

Number of ex-patients examined once, 119; twice, 32; three times, 8.

Number of physicians referring patients to the sanatorium, 123.

There were 9 patients admitted to the sanatorium following examinations at the sanatorium.

The total of all examinations made during the year exclusive of routine work was 1,215.

DENTAL REPORT

The following is a summary of the dental work done during the year:

Examinations	335	Vincent's treatments	32
New patients	335	Ankylosis treatments	5
Office visits	2,769	Hemorrhages checked	3
Extractions	353	Trismus cases	1
Impacted extractions	6	Cellulitis cases	1
Fillings	818	Restorations	12
Prophylaxis	84	Gold crowns	2
Treatments	881	Gold inlays	8
Gum treatments	284	Removing bone process	2
Pyorrhoea cases	55	Emergency cases	7
Osteomyelitis cases	4	Mouth washes	532
Exostosis	2	Repairing bridges	6
Abscess treatments	7	Repairing plates	12
Stomatitis treatments	24	Bridges	2
Gingivitis treatments	22		

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in sanatorium November 30, 1932	185	183	368
Patients admitted December 1, 1932, to November 30, 1933, inclusive	174	183	357
Patients discharged December 1, 1932, to November 30, 1933, inclusive	181	184	365
Patients remaining in sanatorium November 30, 1933	178	182	360
Daily average number of patients	167.14	174.42	341.56
Deaths (included in number discharged)	37	25	62

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Percentage	
	1932	1933	1932	1933	1932	1933
Minimal	86	61	44	34	11.20	9.52
Moderately advanced	201	194	155	144	39.44	40.31
Far advanced	50	68	159	152	40.46	42.60
Unclassified	53	30	17	10	4.33	2.80
Childhood type	3	4	7	5	1.78	1.40
Carcinoma	–	–	3	–	.76	–
Fibrosarcoma	–	–	1	–	.25	–
Tuberculous pleurisy	–	–	1	4	.25	1.13
Chronic bronchiectasis	–	–	6	2	1.53	.56
Non-tuberculous	–	–	–	2	–	.56
Lung abscess	–	–	–	2	–	.56
Empyema	–	–	–	1	–	.28
Hodgkin's disease	–	–	–	1	–	.28
	393	357	393	357		

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	84	106	190
Married	79	65	144
Widowed	7	7	14
Divorced	4	5	9
	174	183	357

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Totals	Percentages
Under 20 years	11	26	37	10.37
20 to 29 years	71	97	168	47.06
30 to 39 years	45	38	83	23.24
40 to 49 years	26	16	42	11.76
50 to 59 years	11	4	15	4.21
60 to 69 years	7	2	9	2.52
70 and over	3	–	3	.84
Average age	33.80	28.06	30.93	
Total	174	183	357	

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	95	31	36	96	35	31	191	66	67
Other New England States	18	18	17	11	8	7	29	26	24
Other States	8	9	8	10	10	14	18	19	22
Total Native	121	58	61	117	53	52	238	111	113
Other Countries (24) Total Foreign	53	115	110	66	126	126	119	241	236
Unknown	–	1	3	–	4	5	–	5	8
Grand Totals	174	174	174	183	183	183	357	357	357

TABLE 6.—*Residence of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Adams	1	Framingham	2	Melrose	5	Sharon	2
Agawam	1	Gardner	5	Milford	2	Shirley	1
Arlington	6	Gloucester	1	Milton	1	Somerville	14
Athol	2	Grafton	1	Montague	2	Southbridge	2
Attleboro	4	Great Barrington	1	Natick	4	Spencer	1
Barre	1	Hadley	2	Needham	1	Springfield	16
Belmont	7	Hanover	1	New Bedford	1	Sudbury	1
Boston	74	Harwich	1	New Marlboro	1	Uxbridge	1
Brookline	1	Holyoke	8	Newton	12	Wakefield	1
Cambridge	8	Hopedale	1	North Adams	2	Walpole	1
Cambridge, N. Y.	1	Hubbardston	1	Northboro	2	Waltham	2
Chelsea	14	Hudson	2	Northbridge	1	Warren	1
Chicopee	4	Leominster	1	Norwood	5	Watertown	12
Clinton	1	Lexington	1	Palmer	3	Webster	4
Concord	2	Longmeadow	3	Pensacola, Fla.	1	Wellesley	1
Dartmouth	1	Lowell	8	Pittsfield	2	Westfield	1
Dudley	1	Lynn	2	Pleasant Val'y, Ct.	1	Westford	1
Everett	8	Malden	8	Plymouth	1	Weymouth	2
Fall River	6	Marlboro	1	Quincy	1	Wilmington	1
Falmouth	1	Marshfield	1	Reading	2	Winchester	2
Fitchburg	4	Maynard	2	Revere	20	Winthrop	5
Fort Fairfield, Me.	1	Medfield	1	Rockland	1	Worcester	6
Foxboro	1	Medford	3	Salem	1		
						Total	357

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Minimal	11	23	34	9.52
Moderately advanced	63	81	144	40.31
Far advanced	89	63	152	42.60
Unclassified	4	6	10	2.80
Childhood type	1	4	5	1.40
Tuberculous pleurisy	1	3	4	1.13
Chronic bronchiectasis	–	2	2	.56
Non-tuberculous	2	–	2	.56
Lung abscess	2	–	2	.56
Empyema	–	1	1	.28
Hodgkin's disease	1	–	1	.28
	174	183	357	

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Arrested	2	1	3	.83
Apparently arrested	5	5	10	2.74
Quiescent	80	80	160	43.80
Improved	24	28	52	14.25
Unimproved	25	38	63	17.26
Dead	37	25	62	16.99
Non-tuberculous	2	2	4	1.09
No diagnosis	–	1	1	.27
Not considered	6	4	10	2.77
	181	184	365	

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month	1	–	1	4	–	4
1 to 2 months	–	–	–	8	2	10
2 to 3 months	–	–	–	2	1	3
3 to 4 months	1	1	2	1	4	5
4 to 5 months	–	–	–	3	1	4
5 to 6 months	1	–	1	3	2	5
6 to 7 months	–	–	–	1	1	2
7 to 8 months	1	–	1	–	3	3
8 to 9 months	2	–	2	–	1	1
9 to 10 months	1	–	1	1	–	1
10 to 12 months	2	1	3	3	1	4
12 to 18 months	5	5	10	5	5	10
18 to 24 months	–	1	1	1	1	2
Over 2 years	23	17	40	5	3	8
	37	25	62	37	25	62

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	35	25	60
Lung abscess	1	–	1
Hepatitis, pancreatitis and cholecystitis	1	–	1
	37	25	62

Financial Report, Rutland State Sanatorium, 1933

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1933.

STATEMENT OF EARNINGS

Board of patients:		
Private	$30,477 00	
Cities and towns	89,646 49	
Worcester County	17,340 29	
Tubercular Hospital District (Chelsea, Revere and Winthrop)	41,712 07	
		$179,175 85
Personal services:		
Reimbursement from Board of Retirement		$132 60
Sales:		
Travel, transportation and office expenses	$19 00	
Food	83 38	
Medical and general care	260 75	
Heat, light and power	2 00	
Farm	352 15	
Garage, stable and grounds	152 11	
Repairs, ordinary	6 50	
Total sales		$875 89

Miscellaneous:			
Interest on bank balances	$51 29		
Rents	120 00		
Sanatorium Patients' Fund	30 50		
Total, miscellaneous		$201 79	
Total earnings for the year			$180,386 13
Total cash receipts reverting and transferred to the State Treasurer			191,343 71
Accounts receivable outstanding Dec. 1, 1932, adjusted		$160,894 34	
Accounts receivable outstanding Nov. 30, 1933	149,936 76		
Accounts receivable decreased			$10,957 58

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$8,315 19
Appropriation, current year	$276,800 00	
Deficiency, 1931	671 25	
		277,471 25
Total		$285,786 44
Expenditures as follows:		
Personal services	$160,342 42	
Food	41,601 61	
Medical and general care	11,833 99	
Farm	10,389 35	
Heat, light and power	21,202 61	
Garage, stable and grounds	1,832 64	
Travel, transportation and office expenses	3,380 82	
Religious instruction	1,770 00	
Clothing and materials	251 16	
Furnishings and household supplies	10,776 93	
Repairs, ordinary	5,895 52	
Repairs and renewals	6,225 51	
Total maintenance expenditures		$275,502 56
Balance of maintenance appropriation, Nov. 30, 1933		10,283 88
Estimated outstanding liabilities, Nov. 30, 1933		$1,911 79

SPECIAL APPROPRIATIONS

Balance December 1, 1932, brought forward		$7,315 59
Appropriations for current year		00,000 00
Total		$7,315 59
Expended during the year (see statement below)	$7,179 70	
Reverting to Treasury of Commonwealth	* 135 89	
(Star balances below that are reverting)		7,315 59
Balance November 30, 1933, carried to next year		$0,000 00

APPROPRIATION	Act or Resolve ch.	Act or Resolve yr.	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Electrical Equipment	245	1931	$7,000 00	–	$6,884 41	$115 59*
X-ray Equipment	170	1932	7,200 00	$7,179 70	7,179 70	20.30*
			$14,200 00	$7,179 70	$14,064 11	$135 89

PER CAPITA

During the year the average number of patients has been		341 56
Total cost of maintenance	$275,502 56	
Equal to a weekly per capita cost of (52 weeks to year)	15 51	
Total receipts for the year	191,343 71	
Equal to a weekly per capita of	10 77	
Total net cost of maintenance for year (total maintenance less total receipts)		$84,158 85
Net weekly per capita	4 74	

Respectfully submitted,
MARY A. BOYLE,
Treasurer.

Inventory: Rutland State Sanatorium

GRAND SUMMARY SHEET

November 30, 1933

REAL ESTATE

Land (364.727 acres)	$12,575 00	
Buildings	690,795 37	
Betterments (additions and improvements)	149,621 13	
Total		$852,991 50

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$382 86	
Food	4,417 73	
Clothing and materials	949 78	
Furnishings and household supplies	2,548 55	
Medical and general care	2,598 54	
Heat, light and power	6,604 80	
Farm	6,493 62	
Garage, stable and grounds	49 39	
Repairs	5,681 28	
		$29,726 55

Personal Property Distributed Supplies

Travel, transportation and office expenses	$1,499 76	
Clothing and materials	124 81	
Furnishings and household supplies	33,496 86	
Medical and general care	8,273 90	
Heat, light and power		
Farm	29,215 52	
Garage, stable and grounds	1,217 50	
Repairs	1,197 76	
Total		$75,026 11

Grand Summary

Real Estate — Total	$852,991 50
Personal Property — Undistributed Supplies, Total	29,726 55
Personal Property — Distributed Supplies, Total	75,026 11
	$957,744 16

WESTFIELD STATE SANATORIUM

Resident Officers

Roy Morgan, M.D., *Superintendent.*
Heman B. Chase, M.D., *Assistant Superintendent.*
J. Ernest Landry, M.D., *Senior Physician.*
Bernard Goldblatt, M.D., *Assistant Physician.*
Eliot H. Luther, M.D., *Assistant Physician.*
George E. Crowell, D.M.D., *Dentist.*
Bessie Macdonald, R.N., *Superintendent of Nurses and Matron.*
Josephine E. French, *Treasurer.*
John E. Kinsella, *Steward.*
Benjamin J. Sandiford, *Chief Engineer.*
William G. Atkinson, *Head Farmer.*

Non-Resident Officers

*Marshall M. Menzies, M.D., *Consultant in Diseases of the Eyes, Ears, Nose and Throat.*
*John Pallo, M.D., *Consultant in Diseases of the Eyes, Ears, Nose and Throat.*
A. D. Rood, M.D., *Consultant in Bronchoscopy.*

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* Six months each.

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-fourth annual report of the Westfield State Sanatorium for the year ending November 30, 1933.

Financial Statement

During the year there has been expended $219,627.08 for maintenance, a gross weekly per capita cost of $16.81. (There were no special appropriations during the current year).

There has been collected from miscellaneous sources (the total of all collections) $75,162.53. Deducting this amount from the gross maintenance expense leaves a net expense of $144,464.55, a net weekly per capita cost of $11.06. There has been collected from private sources $3,111; from cities and towns $94,222.50.

Two cases were supported wholly or in part from private funds; 76 cases by cities and towns; 20 wholly by the State, and 15 by the Department of Public Welfare, Division of Child Guardianship. There were 27 cases on which settlements had not been determined.

POPULATION

There were 140 patients admitted during the year and 153 were discharged. There were 255 in the sanatorium at the beginning of the year, 242 remaining at the close. The daily average number of patients was 251.26. The average number of employees and officers during the year was 144. Eighty-two cases were admitted from cities and towns of over 25,000 population and 58 from cities and towns of less than 25,000. The average age of patients was 10.99 years. The average length of stay of patients discharged, including deaths, was 403 days. Of the 153 discharged cases, 18 were apparently well, 78 apparently arrested, 26 improved, and 19 unimproved, 2 were quiescent and there were 10 deaths.

MEDICAL REPORT

There has been no change in our medical treatment, except that collapse therapy has been used to a greater extent. During the year artificial pneumothorax has been used in 19 cases, 376 injections being given. Pneumolysis was performed on 4 cases; thoracoplasty on 1. In addition, we have continued artificial pneumothorax treatments on 8 cases discharged from Rutland, 120 injections being given to these.

We have had no cases of contagious disease in the institution during the year. All patients have received the Dick test and the positive reactors have been immunized with three doses of scarlet fever toxoid.

Our extramural work has been extended by the inauguration of monthly consultation clinics in Great Barrington and Greenfield. As in the past we have furnished medical service to the Hampden County Tuberculosis Association in their county clinics and at Camp Keepwell. Our out-patient work has also increased. The figures for these activities are shown in the following table:

	NEGATIVE		SUSPICIOUS		POSITIVE		TOTAL
	New	Re-exam.	New	Re-exam.	New	Re-exam.	
Consultation . .	451	34	55	15	23	60	618
Out-Patient . .	1,088	248	231	85	153	272	2,077
County Clinics .	589	42	88	88	21	45	873

No articles were published by the staff during the year. In March a lecture was given to Dr. King's class from Harvard, and in May a lecture to the Medical Society at Great Barrington.

INSTITUTION ACTIVITIES

The following special meetings were held at the institution during the year: May 17, the Spring meeting of the State and County superintendents, at which Dr. MacPhedran of the Phipps Institute discussed the X-Ray diagnosis of tuberculosis in children; June 2, the annual meeting of the Western Massachusetts Health officials; and on July 11, the Summer meeting of the Hampden County Medical Association. During the year the superintendent has served as Chairman of the Section on Tuberculosis of the Massachusetts Medical Society.

PERSONNEL CHANGES

Miss Muriel Eales began her work as a social worker on October 1. Otherwise, there has been no addition to our personnel and no important changes.

IMPROVEMENTS AND CHANGES

A new concrete walk to the kitchen has been built to replace the old wooden one. A steam line to the Engineer's cottage has been installed. No other improvements of importance have been made.

RECOMMENDATIONS

Our coal trestle is in bad condition and will have to be repaired. An item of $2,000 has been placed in our budget for this purpose. Several items have also been included in our budget for the improvement of our water supply. These have all been recommended by the Division of Sanitary Engineering.

ACKNOWLEDGMENTS

I wish to thank our clergy and the employees for their loyalty during the year. The cooperation of the Director and other members of the Department has been very helpful and is deeply appreciated.

SURGICAL REPORT

The following operations have been performed at the sanatorium: Tonsillectomy, 10; artificial pneumothorax treatments, 496; thoracentesis, 5.

The following were done at the Massachusetts General Hospital: Pneumolysis, 4; thoracoplasty, 1.

The following were done at the Noble Hospital in Westfield: Mastoid, 1; axillary-abscess, 1.

LABORATORY REPORT

Urine examinations, 260; sputum examinations, 180; blood counts, 245.

DENTAL REPORT

The following table shows the work done in the dental clinic during the year: Prophylactic treatments, 706; fillings—permanent teeth, 918, temporary teeth, 172; extractions—permanent teeth, 259, temporary teeth, 239; treatments, 105; restorations, 18; X-Rays, 50; surgical extractions, 10; examinations, 717; root canal treatments completed, 4. Total, 3,198.

Office and bedside visits, 1,792.

SCHOOL REPORT

Average daily attendance from December, 1932, to December, 1933:

Grade I	23.61	Grade VI	19.34
Grade II	19.64	Grade VII	16.12
Grade III	19.94	Grade VIII	7.89
Grade IV	15.67	Manual Training	11.37
Grade V	20.29		

Total average attendance	153.87
Total enrollment	281

Respectfully submitted,

ROY MORGAN, M.D.
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Number of patients admitted Dec. 1, 1932, to Nov. 30, 1933, inclusive	65	75	140
Number of patients discharged Dec. 1, 1932, to November 30, 1933	68	85	153
Number of deaths (including those in previous items)	4	6	10
Number in sanatorium Dec. 1, 1932	109	146	255
Number remaining Nov. 30, 1933	117	125	242

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1932	1933	1932	1933	1932	1933
Minimal	32	24	22	8	11.16	5.71
Moderately advanced	22	14	13	14	6.60	10.00
Advanced	8	6	8	10	4.06	7.14
Hilum tuberculosis	125	81	122	84	61.93	60.00
Asthma	–	–	–	1	–	.71
Bronchial asthma	–	–	1	–	.51	–
Bronchiectasis	1	–	3	–	1.52	–
Cervical adenitis	1	–	1	2	.51	1.42
Diabetes	–	–	–	1	–	.71
Feeble-minded	–	–	1	–	.51	–
Hemophilia	–	–	1	–	.51	–
Malnutrition	–	–	8	9	4 06	6.44
Pleurisy	–	–	1	–	.51	–
Pleurisy with effusion	2	–	4	1	2.03	.71
Pott's disease	–	1	2	1	1.01	.71
Pyelitis	–	–	1	–	.51	–
Pulmonary abscess	–	–	–	1	–	.71
Tuberculous Laryngitis	–	1	–	–	–	–
No disease	–	–	4	4	2.03	2.87
Unclassified	6	13	5	4	2.54	2.87
	197	140	197	140		

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	65	75	140

TABLE 4.—*Ages of Patients Admitted*

	Males	Females	Totals	Percentages
Under 5 years	3	1	4	2.9
5 to 9 years	15	29	44	31.4
10 to 14 years	33	27	60	42.8
15 to 19 years	14	18	32	22.9
20 years and over	0	0	0	0
	65	75	140	100.00

Average age 10.99 years.

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	59	20	28	67	22	28	126	42	56
Other New England States	4	5	7	4	4	5	8	9	12
Other States	2	5	3	2	13	8	4	18	11
Total Native	65	30	38	73	39	41	138	69	79
Other Countries:									
Albania	0	0	0	1	0	0	1	0	0
Armenia	0	0	0	0	2	2	0	2	2
Canada	0	8	4	1	11	8	1	19	12
England	0	1	0	0	0	2	0	1	2
France	0	0	0	0	0	1	0	0	1
Germany	0	0	0	0	0	1	0	0	1
Greece	0	1	1	0	1	1	0	2	2
Ireland	0	2	3	0	1	1	0	3	4
Italy	0	3	2	0	2	2	0	5	4
Lithuania	0	3	3	0	1	1	0	4	4
Poland	0	4	4	0	10	11	0	14	15
Portugal	0	0	0	0	2	1	0	2	1
Russia	0	2	2	0	0	0	0	2	2
Scotland	0	0	0	0	2	0	0	2	0
Sweden	0	0	0	0	1	1	0	1	1
Syria	0	1	1	0	0	0	0	1	1
Spain	0	0	0	0	1	0	0	1	0
Total, Other Countries	0	25	20	2	34	32	2	59	52
Unknown	0	10	7	0	2	2	0	12	9
Total	0	35	27	2	36	34	2	71	61
Total Native	65	30	38	73	39	41	138	69	79
Grand Total	65	65	65	75	75	75	140	140	140

TABLE 6.—*Residence of Patients Admitted*

Agawam	1	Foxborough	1	Milford	2	Ware	2
Arlington	1	Gill	2	Millis	3	Warren	2
Athol	2	Grafton	1	Natick	3	Winchester	2
Attleboro	1	Greenfield	1	Northampton	2	Windsor	1
Barre Plains	1	Hampden	1	Northborough	1	Westborough	1
Boston	22	Hardwick	1	Princeton	1	Westfield	1
Braintree	1	Holden	2	Quincy	1	Weymouth	1
Brockton	1	Holyoke	2	Sharon	1	Worcester	6
Cambridge	1	Huntington	1	Shirley	3	Wrentham	1
Chicopee	6	Leominster	2	Somerville	2		
East Bridgewater	2	Lexington	4	Southbridge	3	Total	140
Easthampton	1	Longmeadow	1	Springfield	20		
Fitchburg	20	Malden	1	Stoughton	1		

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Minimal	5	3	8	5.71
Moderately advanced	4	10	14	10.00
Advanced	3	7	10	7.13
Hilum tuberculosis	40	44	84	60.00
Asthma	1	0	1	.71
Cervical adenitis	0	2	2	1.47
Diabetes	1	0	1	.71
Malnutrition	4	5	9	6.42
Pleurisy with effusion	1	0	1	.71
Pulmonary abscess	1	0	1	.71
Pott's disease	0	1	1	.71
No disease	2	2	4	2.86
Unclassified	3	1	4	2.86
	65	75	140	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	33	45	78	50.98
Apparently well	10	8	18	11.77
Quiescent	0	2	2	1.31
Improved	15	11	26	16.99
Unimproved	6	13	19	12.41
Died	4	6	10	6.54
	68	85	153	100.00

TABLE 9.—*Deaths, by Length of Residence, at Sanatorium*

	Males	Females	Totals
1 to 2 months	1	0	1
2 to 3 months	0	1	1
5 to 6 months	0	1	1
7 to 8 months	0	1	1
8 to 9 months	1	0	1
10 to 24 months	0	3	3
Over 2 years	2	0	2

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	3	6	9
Asthma	1	0	1

Financial Report, Westfield State Sanatorium, 1933

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1933.

STATEMENT OF EARNINGS

Board of patients:			
Private	$1,685 00		
Cities and towns	67,927 93		
		$69,612 93	
Personal services:			
Reimbursement from Board of Retirement		$98 38	
Sales:			
Food	$22 33		
Clothing and materials	540 45		
Furnishings and household supplies	1 48		
Medical and general care	58 50		
Heat, light and power	9 00		
Farm	562 21		
Garage, stable and grounds	63 28		
Arts and crafts sales	305 90		
Total Sales		$1,563 15	
Total earnings for the year			$71,274 46
Total cash receipts reverting and transferred to the State Treasurer			$75,162 53
Accounts receivable outstanding Dec. 1, 1932		$27,720 57	
Accounts receivable outstanding Nov. 30, 1933		23,832 50	
Accounts receivable decreased			$3,888 07

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$5,048 28
Appropriation, current year	$225,165 00	
		$225,165 00
Total		$230,213 28
Expenditures as follows:		
Personal services	$142,040 01	
Food	26,332 51	
Medical and general care	7,165 16	
Farm	8,875 30	
Heat, light and power	13,125 29	
Garage, stable and grounds	2,475 05	
Travel, transportation and office expenses	3,212 05	
Religious instruction	1,045 00	
Clothing and materials	3,140 21	
Furnishings and household supplies	6,479 61	
Repairs, ordinary	4,017 31	
Repairs and renewals	1,719 58	
Total maintenance expenditures		$219,627 08
Balance of maintenance appropriation, Nov. 30, 1932		10,586 20
Estimated outstanding liabilities, Nov. 30, 1933		$5,607 68

SPECIAL APPROPRIATIONS

Balance December 1, 1932, brought forward		$11,573 13
Appropriations for current year		
Total		$11,573 13
Expended during the year (see statement below)	$	
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*11,549 56	11,549 56
Balance November 30, 1933, carried to next year		$23 57

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at end of Year
Equipment for water supply	1932	$1,500	–	$1,476 43	$23 57
		79,500		69,464 52	10,035 48
		6,000		4,548 73	1,451 27
		5,000		4,966 85	33 15
		6,000		5,970 34	29 66
		$98,000		$86,426 87	$11,573 13

PER CAPITA

During the year the average number of patients has been		251 26
Total cost of maintenance	$219,627 08	
Equal to a weekly per capita cost of (52 weeks to year)	$16.81	
Total receipts for the year	$75,162 53	
Equal to a weekly per capita of	5.752	
Total net cost of maintenance for year (total maintenance less total receipts)		$144,464 55
Net weekly per capita	11.06	

Respectfully submitted,

JOSEPHINE E. FRENCH,
Treasurer.

Inventory: Westfield State Sanatorium

GRAND SUMMARY SHEET

November 30, 1933

REAL ESTATE

Land, 263.06 acres	$11,021 00	
Buildings	447,258 18	
Betterments (additions and improvements)	—	
Total, Real Estate		$458,279 18

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$100 00	
Food	3,784 07	
Clothing and materials	2,983 17	
Furnishings and household supplies	2,916 43	
Medical and general care	906 30	
Heat, light and power	1,168 38	
Farm	1,172 02	
Garage, stable and grounds	58 23	
Repairs	31 89	
		$13,120 49

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$3,708 76	
Clothing and materials	870 45	
Furnishings and household supplies	39,009 63	
Medical and general care	43,304 50	
Heat, light and power	3,669 28	
Farm	34,880 42	
Garage, stable and grounds	7,410 87	
Repairs	2,668 02	
Total		$135,521 93

GRAND SUMMARY

Real Estate — Total	$458,279 18	
Personal Property — Undistributed Supplies, Total	13,120 49	
Personal Property — Distributed Supplies, Total	135,521 93	
		$606,921 60

PONDVILLE HOSPITAL

RESIDENT OFFICERS

GEORGE M. SULLIVAN, M.D., *Superintendent.*
RAYMOND E. MILITZER, M.D., *Assistant Superintendent.*
THOMAS J. ANGLEM, M.D., *Senior Physician.*
GEORGE L. MACKINNON, M.D., *Assistant Physician.*
WILLIAM H. ROPER, M.D., *Assistant Physician.*
HENRY G. CLARKE, M.D., *Assistant Physician.*
THEODORE P. EBERHARD, M.D., *Pathologist.*
DOROTHY Z. SILVER, R.N., *Principal of School of Nursing.*
MARION MACKENZIE, *Treasurer.*
NEIL FOUNTAIN, *Head Social Service Worker.*
MAY E. DONOVAN, *Head Housekeeper.*
ERNEST L. GAGE, *Chief Power Plant Engineer.*
DANIEL DONOVAN, *Groundskeeper.*

NON-RESIDENT OFFICERS

ERNEST M. DALAND, M.D., *Chief of Visiting Staff (Surgeon).*
GRANTLEY W. TAYLOR, M.D., *Senior Physician (Assistant Surgeon).*
HORATIO ROGERS, M.D., *Senior Physician (Assistant Surgeon).*
RICHARD DRESSER, M.D., *Senior Physician (Roentgenologist).*
CHARLES E. DUMAS, M.D., *Senior Physician (Assistant Roentgenologist).*
JOE VINCENT MEIGS, M.D., *Senior Physician (Gynecologist).*
LANGDON PARSONS, M.D., *Senior Physician (Assistant Gynecologist).*
RICHARD H. WALLACE, M.D., *Senior Physician (Assistant Surgeon).*
ROGER C. GRAVES, M.D., *Senior Physician (Urologist).*
CHARLES J. E. KICKHAM, M.D., *Senior Physician (Assistant Urologist).*
CARL H. ERNLUND, M.D., *Senior Physician (Laryngologist).*
HENRY JACKSON, JR., M.D., *Senior Physician (Internist).*
DUDLEY MERRILL, M.D., *Senior Physician (Assistant Internist).*
MAXWELL FINLAND, M.D., *Senior Physician (Assistant Internist).*
JOHN S. HODGSON, M.D., *Senior Physician (Neurological Surgeon).*
ARTHUR M. GREENWOOD, M.D., *Senior Physician (Dermatologist).*
RICHARD H. NORTON, D.M.D., *Senior Physician (Oral Surgeon).*
SHIELDS WARREN, M.D., *Senior Physician (Pathologist).*
VALMORE A. PELLETIER, M.D., *Senior Physician (Assistant Surgeon Out-Patient Department).*
HARRY W. HARDING, D.M.D. *(Dentist).*
HUGO B. C. REIMER, M.D., *Senior Physician (Ophthalmologist).*
JAMES C. HUDSON, PH.D. *(Physicist).*

Report of the Superintendent

TO HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the seventh annual report of the Pondville Hospital (Norfolk), P. O. at Wrentham, Massachusetts, for the year ending November 30, 1933.

FINANCIAL STATEMENT

During the year, for maintenance there has been expended $220,894.29, representing a gross weekly per capita cost of $37.65. There has been collected from miscellaneous sources $60,415.59 (total of all collections). Of this sum, $18,880.59 came from private sources; $39,652.25 came from cities and towns; $1,222.50 came from out-patient department; $19.25 came from accident cases; $69.16 came from the State Board of Retirement; $20.90 was interest on bank account; $120.00 for room rent; and from miscellaneous sales $430.94.

Deducting the above total collections from the maintenance expenses leaves a net expense of $160,478.70, equivalent to a net weekly cost per capita of $27.42.

Four hundred and ninety patients were supported by private funds, 434 by cities and towns, 96 by the State, leaving 68 settlements pending.

From special appropriations, no funds have been expended during this fiscal year.

POPULATION

On November 30, 1932, 119 patients remained in the hospital. During the year, there were 1,203 admissions. Of these, 181 represented readmissions. Patients were received from 161 cities and towns; patients were also received from 11 other State institutions. One hundred and two patients remained in the hospital at the end of the year.

Discharges during the year numbered 1,220. The condition of 197 was the same; 767 were improved; and 256 died. There were 154 autopsies.

The average stay in the hospital was 37.14 days per patient. The smallest number in the hospital on any one day was 100; the largest number 120. The average number of patients per day was 112.53.

Daily average number of officers and employees, 130.20.

MEDICAL REPORT

The weekly clinic at the hospital was continued through the year with 51 clinics held. Visits to the regular Thursday clinic numbered 2,709, with an average attendance of 53. Patients making their first visit to the clinic numbered 1,132. Out-patient visits, other than the regular Thursday clinic numbered 1,720. Of these, 157 were new patients. Total clinic visits, 4,429.

Three hundred and ninety-eight clinic patients subsequently entered the hospital.

During the year, two articles were written by members of the staff: "Cysts of the Prostate" by Dr. Roger C. Graves and Dr. C. J. E. Kickham; and "The Calcium, Potassium and Inorganic Phosphate Content of the Serum in Cancer Patients. The Effect of Roentgen Ray Radiation on the Level of these Substances in Blood Serum of Cancer Patients" by Dr. Henry Jackson, Jr. and Dr. F. H. L. Taylor.

X-Ray and Radium:

Diagnostic X-Ray plates taken, 3,307; fluoroscopic examinations, 582; X-Ray treatments given, 3,403; radium treatments given, 496.

SURGICAL REPORT

Operations, 1,333; esophagoscopies, 5; laryngoscopies, 4; cystscopies, 155; proctoscopies, 63.

An anesthetic was given 1,125 times.

LABORATORY REPORT

Surgical specimens, 1,006; frozen sections, 146; laboratory tests, 15,495.

DENTAL REPORT

Prophylactic treatments, 182; extractions (permanent teeth), 1,048; treatments, 333; X-Ray examinations, 105; examinations, 729. Total, 2,397.

Total number of visits, 1,189; total number of new patients, 721; total number of dismissals, 359.

INSTITUTIONAL ACTIVITIES

During the year, there has been further expansion in the work of all departments of the hospital. Admissions and discharges have been handled much more efficiently. While the number of hospital admissions has increased 18 per cent over the previous years, the average length of stay in the hospital has been reduced from 44.04 days to 37.14 days. Careful study of the cases by the resident staff and more frequent visits of the visiting physicians have minimized delay in outlining X-Ray or radium treatment or doing operations. This quickened turnover of house patients has been somewhat helpful in reducing the waiting list.

The number of operations increased 36 per cent during the past year. In part, this is due to an attempt to get biopsies on all patients. Because of this, there has been a proportional increase in the number of surgical specimens handled by the pathological department. Autopsies increased 21 per cent while the number of deaths increased but 1.2 per cent.

The out-patient department has continued to expand. The number of out-patient visits increased 927, to a total of 4,429. While the average attendance at the Thursday clinic was only 53, there were several clinics when the attendance was between 85 and 90.

Good fellowship among the employees has been promoted by occasional dances, motion pictures, and bridge parties. Baseball has been enjoyed by both players and nonplayers. The tennis court has been improved. This and the croquet court have provided other forms of diversion.

PERSONNEL CHANGES

During the year, additions and changes were made as follows:

Visiting Staff:

Dr. Richard H. Wallace was appointed Assistant Surgeon, and Dr. Maxwell Finland, Assistant Internist.

Resident Staff:

Dr. Hoosig H. Serunian resigned as Senior Physician and Dr. Roy E. Mabrey, Assistant Physician, was promoted to Senior Physician. Dr. Theodore P. Eberhard was appointed Pathologist to succeed Dr. James T. Fallon, resigned. Dr. John J. Decker, Assistant Physician, resigned to accept the position of Assistant Superintendent at the Lakeville State Sanatorium and was succeeded by Dr. William H. Roper. Dr. Roy E. Mabrey resigned as Senior Physician and Dr. Thomas J. Anglem, Assistant Physician, was promoted to Senior Physician. Dr. Raymond E. Militzer, Assistant Physician, was promoted to Assistant Superintendent. Dr. George L. MacKinnon and Dr. Henry G. Clarke were appointed Assistant Physicians.

IMPROVEMENTS AND CHANGES

During the year, the work of clearing the land around the buildings and of making roads was continued.

The buildings were painted inside and out and are now in good condition.

The boiler settings in the power plant had to be reinforced and repaired in order to make the steam fittings secure.

The dosing tank at the filter beds has been covered with a cement and crushed-stone top which completes the work.

The new water pump has been installed at the wells which greatly shortens the time of pumping.

During the coming year, it is hoped that more beds may be added, as well as a new service building which is greatly needed at the institution. The number of admissions to the house has increased, as well as the number of visits to the out-patient department, which necessitates larger clinical facilities and a larger dining room and kitchen space for service.

ACKNOWLEDGMENTS

It is a pleasure to acknowledge the work of the chaplains, the Rev. Melville Shafer and the Rev. Father Mitchell, also the Social Service Committee, and the cooperation of officers and employees of the hospital.

Respectfully submitted,
GEORGE M. SULLIVAN, M.D.,
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in hospital December 1, 1932	65	54	119
Patients admitted from December 1, 1932, to November 30, 1933, inclusive	590	613	1,203
Patients discharged from December 1, 1932, to November 30, 1933, inclusive	597	623	1,220
Patients remaining in hospital November 30, 1933	58	44	102
Daily average number of patients	60.76	51.77	112.53
Deaths (included in number discharged)	167	89	256

TABLE 2.—*Readmissions*

	Males	Females	Totals
Total patients treated	655	667	1,322
Less old patients readmitted first time since December 1, 1932	45	72	117
Less other readmissions	125	109	234
Less patients in hospital December 1, 1932	65	54	119
Number new patients admitted from December 1, 1932, to November 30, 1933	420	432	852
Total number different patients treated December 1, 1932, to November 30, 1933	530	558	1,088

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	79	44	123
Married	239	277	516
Widowed	89	94	183
Divorced	12	13	25
Separated	1	4	5
Totals	420	432	852

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Totals
Under 20 years	5	6	11
20 to 29 years	13	14	27
30 to 39 years	26	58	84
40 to 49 years	49	111	160
50 to 59 years	96	110	206
60 to 69 years	128	79	207
70 to 79 years	85	38	123
80 to 89 years	18	16	34
Totals	420	432	852

TABLE 5.—*Nativity of Patients Admitted*

	Males	Females	Total		Males	Females	Total
United States	223	250	473	Italy	28	13	41
Africa	0	1	1	Latvia	0	1	1
Armenia	3	0	3	Lithuania	4	3	7
Austria	3	1	4	Norway	1	2	3
Canada	53	74	127	Poland	14	5	19
Czechoslovakia	2	1	3	Portugal	9	10	19
England	20	11	31	Russia	4	7	11
Finland	1	3	4	Scotland	4	10	14
France	2	1	3	Sweden	5	6	11
Germany	5	7	12	Syria	1	2	3
Greece	4	3	7				
Ireland	34	21	55	Totals	420	432	852

TABLE 6.—*Residence of Patients Admitted*

Abington	4	Franklin	12	Millville	2	Spencer	1
Amherst	1	Freetown	2	Milton	3	Springfield	26
Arlington	4	Gardner	10	Monson	2	Stoughton	4
Ashburnham	1	Georgetown	1	Montague	3	Sudbury	1
Athol	6	Gloucester	1	Natick	2	Sunderland	1
Attleboro	31	Grafton	3	Needham	1	Sutton	1
Avon	1	Granville	1	New Bedford	23	Swansea	1
Bellingham	4	Greenfield	4	Newburyport	3	Taunton	42
Berkley	2	Hardwick	2	New Salem	1	Templeton	3
Beverly	2	Harwich	1	Newton	4	Tewksbury	1
Blackstone	3	Hatfield	1	Norfolk	2	Tisbury	1
Boston	93	Haverhill	5	North Adams	6	Tyringham	1
Braintree	2	Hawley	1	North Andover	2	Upton	1
Bridgewater	3	Holden	1	No. Attleborough	28	Uxbridge	6
Brimfield	1	Holliston	3	North Brookfield	1	Wakefield	1
Brockton	33	Holyoke	4	Northborough	1	Walpole	4
Brookline	1	Hopedale	1	Northbridge	2	Waltham	3
Cambridge	14	Hopkinton	1	Norton	3	Ware	3
Canton	1	Hull	1	Norwood	13	Wareham	1
Charlton	1	Huntington	3	Oak Bluffs	3	Watertown	4
Chatham	1	Ipswich	1	Orange	1	Webster	4
Chelmsford	1	Lakeville	1	Palmer	1	Wellesley	1
Chelsea	1	Lawrence	23	Peabody	2	West Bridgewater	1
Chesterfield	1	Lee	1	Pembroke	1	West Springfield	5
Chicopee	5	Leominster	14	Petersham	1	Westborough	1
Dalton	2	Lowell	19	Pittsfield	9	Westfield	5
Dartmouth	1	Lynn	23	Plainville	1	Westford	1
Dedham	17	Malden	4	Provincetown	1	Westport	2
Deerfield	4	Mansfield	10	Quincy	12	Weston	1
Dighton	1	Marblehead	1	Randolph	2	Westwood	2
Douglas	1	Marlborough	3	Raynham	1	Weymouth	1
Dudley	2	Maynard	1	Rockland	1	Whitman	4
East Bridgewater	3	Medfield	3	Salem	4	Wilbraham	1
East Longmeadow	1	Medway	2	Saugus	4	Williamstown	1
Easthampton	1	Melrose	2	Sharon	1	Winchendon	1
Edgartown	1	Mendon	1	Sherborn	1	Winthrop	2
Fall River	18	Merrimac	1	Shirley	1	Woburn	1
Falmouth	1	Methuen	6	Somerset	1	Worcester	22
Fitchburg	14	Middleborough	8	Somerville	4	Wrentham	3
Foxborough	9	Milford	8	Southbridge	2	Yarmouth	1
Framingham	8	Millbury	1	Southwick	1	State Institutions	37

TABLE 7.—*Stage of Disease of Patients Admitted*

	Males	Females	Totals
Early	92	153	245
Moderately advanced	194	165	359
Advanced	134	114	248
Totals	420	432	852

TABLE 8.—*Condition of Patients Discharged*

	Males	Females	Totals
Same	102	95	197
Improved	328	439	767
Totals	430	534	964

TABLE 9

This table includes all new cases treated, both house patients and out-patients. In some instances, the same patient has been counted twice or more times, according to the varying conditions presented.

	Males	Females	Totals
CARCINOMA:			
Buccal Cavity and Pharynx:			
Buccal cavity	8	1	9
Cheek	7	1	8
Floor of mouth	11	–	11
Lip	60	2	62
Palate	6	1	7
Salivary gland	5	–	5
Tongue	27	2	29
Tonsil	12	1	13
	136	8	144
Digestive Tract and Peritoneum:			
Anus	–	1	1
Bile duct	1	–	1
Cecum	2	–	2
Colon	2	1	3
Esophagus	22	1	23
Gall bladder	1	1	2
Liver	1	1	2
Pancreas	2	2	4
Rectum	30	13	43
Sigmoid	1	–	1
Stomach	25	11	36
	87	31	118
Respiratory System:			
Bronchus	–	1	1
Larynx	14	1	15
Lung	6	1	7
Mediastinum	1	–	1
	21	3	24
Female Genital Organs:			
Cervix	–	109	109
Clitoris	–	1	1
Ovary	–	13	13
Uterus	–	18	18
Vagina	–	3	3
Vulva	–	5	5
	–	149	149
Breast	–	98	98
Male Genito-Urinary Organs:			
Bladder	19	–	19
Kidney	1	–	1
Penis	1	–	1
Prostate	25	–	25
Scrotum	1	–	1
Testicle	4	–	4
	51	–	51

	Males	Females	Totals
Skin:			
Ear	13	1	14
Eyelid	3	8	11
Face	38	25	63
Nose	22	16	38
Scalp	1	4	5
Skin (other sites)	21	6	27
Temple	6	3	9
	104	63	167
Other or Unspecified Organs:			
Antrum	6	2	8
Bladder (female)	–	3	3
Kidney (female)	–	1	1
Neck (primary site unknown)	3	–	3
Nostril	–	1	1
Parotid gland	2	2	4
Submaxillary gland	2	–	2
Thyroid	3	4	7
Urethra (female)	–	2	2
Miscellaneous	6	4	10
	22	19	41
LYMPHOBLASTOMA:			
Lymphoblastoma and Hodgkin's disease	20	8	28
Lymphatic leukemia	2	–	2
Myelogenous leukemia	–	1	1
	22	9	31
ENDOTHELIOMA:			
Ilium	1	–	1
Lymph nodes	–	1	1
Rib	1	–	1
Thigh	–	1	1
Tibia	–	1	1
	2	3	5
SARCOMA:			
Chondrosarcoma:			
Rib	1	–	1
Wrist	–	1	1
Fibrosarcoma:			
Forearm	1	–	1
Liver	1	–	1
Thigh	1	–	1
Thyroid	1	–	1
Karposi type:			
Arm	1	–	1
Leiomyosarcoma:			
Uterus	–	2	2
Liprosarcoma:			
Occipital region	–	1	1
Malignant melanoma:			
Cheek	1	–	1
Eyelid	–	1	1
Foot	–	1	1
Heel	1	–	1
Knee	1	–	1

Table 9—*Continued*

Malignant melanoma:—*continued.*	Males	Females	Totals
Leg	1	1	2
Neck	1	–	1
Toe	–	1	1
Multiple myeloma	2	1	3
Osteogenic sarcoma:			
Femur	2	–	2
Ilium	–	1	1
Sacrum	–	1	1
Scapula	–	1	1
Sarcoma (type and primary site unknown)	1	–	1
	16	12	28
Other Malignancies	1	1	2
Non-Malignant Tumors:			
Adenofibromas	–	17	17
Adenomas	7	9	16
Angiomas	4	2	6
Cysts	8	12	20
Cystadenomas	–	2	2
Fibroids	–	34	34
Fibromas	2	10	12
Giant cell tumors (benign)	–	1	1
Hemangiomas	12	18	30
Hematomas	2	–	2
Lipomas	5	6	11
Neurofibromas	2	–	2
Osteomas	–	2	2
Papillomas	10	20	30
Polyps	11	35	46
Tumors, nature unknown	2	7	9
Other non-malignant tumors	6	6	12
	71	181	252
Rheumatic Diseases, Nutritional Diseases, etc.	21	38	59
Diseases of the Blood and Blood-making Organs	12	12	24
Diseases of the Nervous System and Organs of Special Sense:			
Nervous system	21	17	38
Organs of vision	1	2	3
Ear and mastoid process	2	3	5
	24	22	46
Diseases of the Circulatory System:			
Circulatory system (general)	83	67	150
Lymphatic system	1	1	2
	84	68	152

	Males	Females	Totals
Diseases of the Respiratory System:			
Nasal fossae and anexa	5	4	9
Bronchus	6	1	7
Lungs	73	27	100
Pleura	24	12	36
	108	44	152
Diseases of the Digestive System:			
Buccal cavity and adnexa, pharynx and tonsils	30	20	50
Esophagus	4	–	4
Ulcer of the stomach and duodenum	29	11	40
Stomach	5	8	13
Intestines:			
Diverticulitis	2	5	7
Constipation	10	14	24
Other diseases	32	38	70
Liver	18	11	29
Gall bladder and biliary passages	16	42	58
Pancreas	1	3	4
Peritoneum	6	7	13
	153	159	312
Diseases of the Genito-Urinary System:			
Kidneys and ureters	45	40	85
Bladder	6	11	17
Urethra, urinary abscess, etc.	–	4	4
Prostate	16	–	16
Male genital organs	5	–	5
Female genital organs	–	141	141
Cysts of the ovary	–	15	15
Breast	–	39	39
	72	250	322
Diseases of the Skin and the Cellular Tissue:			
Keloids	1	2	3
Keratoses	51	37	88
Sebaceous cysts	8	8	16
Verruca	9	14	23
Other diseases	18	19	37
	87	80	167
Diseases of the Bones and Organs of Locomotion	14	11	25
Other Conditions	63	81	144
No Disease	13	22	35
No Diagnosis	18	28	46

Financial Report, Pondville Hospital at Norfolk, 1933

To the Department of Public Health:

I respectfully submit the following report of the finances of this Institution for the fiscal year ending November 30, 1933.

STATEMENT OF EARNINGS

Board of patients:			
Private	$17,043 82		
Cities and towns	62,624 39		
Out-patient department	1,383 00		
Accident cases	68 75		
		$81,119 96	
Personal services:			
Reimbursement from Board of Retirement		$69 16	
Sales:			
Food	$38 49		
Medical and general care	3 15		
Garage, stable and grounds	10 00		
Miscellaneous: junk	27 51		
Board and room, including board of special nurses	364 29		
Total sales		$443 44	
Miscellaneous:			
Interest on bank balances	$20 90		
Rents	120 00		
Total miscellaneous		$140 90	
Total earnings for the year			$81,773 46
Total cash receipts reverting and transferred to State Treasurer			$60,415 59
Accounts receivable outstanding December 1, 1932		$79,729 85	
Accounts receivable outstanding November 30, 1933		$101,087 72	
Accounts receivable increased			$21,357 87

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$1,095 42
Appropriation, current year:		
Radium	$8,500 00	
Other maintenance	219,670 00	
Total		$228,170 00
Total		$229,265 42
Expenditures as follows:		
Personal services	$127,757 37	
Food	30,668 53	
Medical and general care	17,772 89	
Heat, light and power	8,854 29	
Garage, stable and grounds	1,254 67	
Travel, transportation and office expenses	8,909 03	
Religious instruction	1,120 00	
Clothing and materials	524 84	
Furnishings and household supplies	14,017 41	
Repairs, ordinary	1,299 01	
Repairs and renewals	2,514 16	
Radium	5,356 29	
Total maintenance expenditures		$220,048 49
Balance of maintenance appropriation, Nov. 30, 1933		$9,216 93
Estimated outstanding liabilities, Nov. 30, 1933		$359 13

SPECIAL APPROPRIATIONS

Balance December 1, 1932, brought forward		$2,294 60
Appropriation for current year		
Total		$2,294 60
Expended during the year (see statement below)		
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	* 2,294 60	
Balance November 30, 1933, carried to next year		$2,294 60

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
New filter beds	245–1931	$10,000	–	$7,705 40	$2,294 60

PER CAPITA

During the year the average number of patients has been		112.53
Total cost of maintenance	$220,048 49	
Equal to a weekly per capita cost of (52 weeks to year)	37 60	
Total receipts for the year	60,415 59	
Equal to a weekly per capita of	10 32	
Total net cost of maintenance for year (total maintenance less total receipts)		$159,632 90
Net weekly per capita	27 28	

Respectfully submitted,

MARION MACKENZIE,
Treasurer.

Inventory: Pondville Hospital at Norfolk

GRAND SUMMARY SHEET

November 30, 1933

REAL ESTATE

Land, 324.2 acres	$9,250 00	
Buildings	479,774 03	
Betterments (additions and improvements)		
Total, Real Estate		$489,024 03
Less 3% depreciation on buildings		14,393 22
		$474,630 81

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$1,362 79	
Food	2,400 78	
Clothing and materials	512 84	
Furnishings and household supplies	2,673 84	
Medical and general care	20,985 71	
Heat, light and power	3,878 28	
Garage, stable and grounds	106 71	
Repairs	6,572 25	
		$38,493 20

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$5,326 02	
Clothing and materials	1,416 47	
Furnishings and household supplies	52,709 58	
Medical and general care	50,943 45	
Garage, stable and grounds	7,918 29	
Repairs	4,260 30	
		$122,574 11
Total. Less 5% Depreciation		6,128 71
		$116,445 40

GRAND SUMMARY

Real Estate — Total	$474,630 81	
Personal Property — Undistributed Supplies, Total	38,493 20	
Personal Property — Distributed Supplies, Total	116,445 40	
Radium in Vault of Emanation Plant	69,880 30	
		$699,449 71

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TWENTIETH ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS

REPORT OF THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1934, the Department of Public Health was constituted as follows:

Commissioner of Public Health . . . . Henry D. Chadwick, M.D.

Public Health Council

Gordon Hutchins, 1937	[1] Richard M. Smith, M.D., 1936
Francis H. Lally, M.D., 1936	Richard P. Strong, M.D., 1935
Sylvester E. Ryan, M.D., 1937	James L. Tighe, B.A.Sc., C.E., 1935

Regular monthly meetings of the Department have been held throughout the year. An additional meeting was held on August 14 for the purpose of visiting Martha's Vineyard, at which time an inspection was made of the local hospital, water supplies were visited, and a conference was held with the Dukes County Commissioners relative to the care of cases of tuberculosis from Dukes County.

The Committee on Sanitary Engineering, composed of Mr. Tighe, Chairman, Mr. Hutchins and the Commissioner, has met each month prior to the regular meeting of the Council and submitted its recommendations on all matters of sanitary significance.

The Council has carried out duties imposed on it by various legislative acts, including the approval of regulations prepared by the Board of Registration of Barbers; approval of appointments at tuberculosis institutions; approval of contracts for the care of cases of tuberculosis between counties; and adoption of rules and regulations for the protection of water supplies of several communities. Nine hearings have been held as required by law on the approval by the Department of taking of land for the protection of water supplies, and for sewage disposal purposes. One hearing was held on the appeal of a milk dealer from the refusal of a board of health to grant a license to sell milk, and a second hearing of the same character was scheduled, but the appellant did not appear. Two informal hearings have been held because of the disapproval by the Department of local nominations of slaughtering inspectors.

Chapter 373 of the Acts of 1934 imposes certain duties on the Department relative to the supervision of the manufacture of frozen desserts and ice cream mix. A public hearing, as required by the law, was held on the proposed rules and regulations promulgated to cover this procedure, and later rules and regulations were adopted.

Advice has been given the Commissioner relative to administrative details within the Department, appointments have been approved, and rules and regulations governing the administration of the sanatoria under the control of the Department have been adopted.

Chapter 32 of the Resolves of 1934 directed a joint investigation by the De- artments of Public Health and Public Works relative to the improvement of sani- ry conditions in the vicinity of Lake Quinsigamond. Inspection trips were made, rings held, and a report prepared and submitted to the Legislature.

Chapter 49 of the Resolves of 1934 provided for a joint investigation by the epartments of Public Health and Public Works of the sewage problem in the

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[1] Appointed November 28, 1934.

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South Essex Sewerage District. With relation to this investigation also it has been necessary to make trips of inspection and to conduct hearings. A report containing recommendations has been prepared and filed with the Legislature, as directed.

At a meeting of the Department on January 15, 1935, the Commissioner of Public Health presented to the Council a report of the doings of the Department for the year 1934, and after discussion it was voted that this report, together with the foregoing brief summary of the activities of the Public Health Council, be approved and adopted as the report of the Department of Public Health for the year 1934.

TWENTIETH ANNUAL REPORT OF THE COMMISSIONER OF PUBLIC HEALTH

To the Public Health Council:

Gentlemen: I have the honor to submit herewith my annual report for the fiscal year ending November 30, 1934, although, as in the past, all figures except those relating to the budget will be given for the calendar year.

It is with much regret that I report the resignation of Dr. Roger I. Lee as a member of the Public Health Council. Because of his interest and knowledge of public health problems and willingness at all times to be of service he had an important part in shaping the policy of the Department. To fill this vacancy the Governor appointed Dr. Richard M. Smith, who, because of his familiarity with medical problems and especially with pediatrics, will be very helpful. We welcome him to the Council.

I. General Matters

The Department has carried on its work throughout the year without having to contend with any serious outbreaks or epidemics. This year, however, has seen the highest incidence of measles ever reported. The other and more serious communicable diseases have shown a gratifying decline in morbidity and mortality.

The pneumonia study and service financed largely by a grant from the Commonwealth Fund has completed its fourth year. The antipneumococcic serum produced and distributed by the Biologic Laboratory is now of greater concentration and potency. There are marked advantages in this as the volume of serum necessary for treatment is reduced and the unit cost lessened. This serum is now available to physicians in twenty-three areas of the State, comprising approximately two-thirds of the population. Before the serum could be made available, laboratory technicians in the forty-five leading hospitals were trained in the Neufeld method of typing so that specimens of sputum could be examined without delay. Physicians were instructed in the therapeutic use of the serum in Type I and Type II cases. This serum is furnished to the attending physicians for those cases who have not been ill more than four days. In the Department laboratory over 6,000 specimens of sputum have been typed during the period of study. An analysis of the records of the pneumonia patients treated with antipneumococcic serum shows that the proper use of the product has resulted in decreasing the expected case fatality rate of Type I by about two-thirds and of Type II cases by about one-half. Thus, definite evidence has been obtained that the lives of many patients ill with these types of pneumonia have been saved by the use of this serum. Antipneumococcic serum is available also for the use of the physicians caring for the 5,000 or more men located in the Civilian Conservation Corps camps of the State.

To the Rockefeller Foundation we are indebted for continued financial support in making a study started last year of deaths from cancer. This includes investigation into the etiology of the disease and cancer mortality records. From the same source funds were allotted to make possible a tabulation of the records of the 400,000 school children examined during the Ten Year Program for tuberculosis case finding. A study of the data thus made available will be of great value, particularly in the evidence that can be obtained on the controversial question as to whether an infection with the tubercle bacillus in childhood protects the individual or renders him more liable to contract tuberculosis later in life.

The Commonwealth Fund has made a grant to the Harvard Medical School to carry on through the Pediatrics Department of the Children's Hospital in cooperation with the Department of Public Health an investigation of the value of placental extract in the control of measles. Dr. McKhann of the Children's Hospital, and Dr. Robinson, Director of the Division of Biologic Laboratories, are working together on the project. In a series of over 1,000 children exposed to measles and treated with this extract, the attack was prevented or modified in all but about 5 per cent. When the extract is used within four days of exposure, the attack is usually prevented. If used after the fourth day and before the rash appears, the attack is modified. The modified disease appears to confer permanent immunity and is the desirable thing to bring about except in infants and debilitated children. In the latter, the disease can be prevented, thereby postponing measles until a later time when the course of the disease is much less serious and but very rarely fatal. We are very optimistic about this extract becoming a valuable agent in the control of measles.

The Milk Control Board, consisting of the Commissioner of Agriculture, the Attorney General, and the Commissioner of Public Health, has given much time to a revision of rules and regulations relating to the sanitary handling of milk. Standards have been established for several different grades which are now ready for submission to the Governor and Council for their approval.

The Department of Conservation, the Metropolitan District Commission, and the Department of Public Health, serving as a Joint Board, prepared a ten year plan for increasing the recreational facilities of the State. The recommendation was made that large tracts of waste or unproductive land be purchased each year which could be reforested, used for the propagation of game, and opened to the public for camping purposes; also that pollution of streams and ponds be prevented wherever possible and that these be stocked for the benefit of the fishermen; and that additional beaches should be purchased and made available to the public. This report has been submitted to the Legislature.

Milk Regulations.—The past year has been unusually free from the point of view of milk-borne disease. No cases of typhoid fever, scarlet fever, or septic sore throat have been directly traced to such a source. Fifteen cases of undulant fever have appeared in almost all of which there was a history of consumption of raw milk from a herd known to be infected with contagious abortion.

The most significant development during the year from the point of view of the protection of the milk supply was in the city of Attleboro, where a milk dealer went to court to challenge the validity of a regulation requiring pasteurization or certification of all milk. This case, which was heard in the Superior Court, resulted in a verdict upholding the regulation, but the case has now been appealed to the Supreme Court. Our latest information, however, is that the plaintiff in the case will withdraw his exceptions, and therefore no decision will be obtained from that court. This is unfortunate as we had hoped for a decision from the Massachusetts Supreme Court. Such regulations, however, have been upheld in the supreme courts of five other states.

The following cities and towns in the Commonwealth have regulations requiring pasteurization or certification of all milk: Ayer, Boston, Brookline, Chelsea, Dedham, Fall River, Framingham, Lexington, Newton, Salem, Swampscott, Waltham, Watertown, Winchester. Attleboro, Cambridge, Milton, Quincy, Stoneham and Wellesley have recently adopted such regulations but they have not yet become effective.

II. District Health Units

Cape Cod Health Bureau.—The Cape Cod Health Bureau, comprising all of Barnstable County, with a population of about 32,000, continues to function in a manner satisfactory to the area. No new projects have been developed. It is to be hoped, however, that a milk laboratory will be included in its program in the near future. As dairy inspection service is being taken over by the State Department of Agriculture, the local health departments will be relieved of much of this routine work. They should, however, carry on a milk laboratory as frequent examinations of samples of milk provide the best evidence as to how the milk is handled on the farm. When milk is unclean or improperly cooled, the bacterial count is found to be high and the cause should be investigated at once. This serves as a much better method of control than an occasional visit to the farm for routine inspections.

The Southern Berkshire Health District.—The sixteen towns comprising the District, with a population of about 21,000, voted at their respective town meetings on an article in the warrant which would make them officially members of the Health District. Favorable action was obtained in seven towns, namely, Becket, Great Barrington, Monterey, Mount Washington, Richmond, Sheffield, and Tyringham. In the other towns the vote was unfavorable or for postponement. The seven towns have organized to form the legally constituted Southern Berkshire Union Health District, and Dr. Mortimer T. Cavanaugh is Chairman. At town meetings in 1935 the article will be re-submitted in Egremont, Sandisfield, New Marlboro, Alford, Lee, Lenox, Stockbridge, West Stockbridge, and Otis. It is expected that most, if not all of them, will vote to join the union. With this nucleus of towns organized to carry on a constructive health program, it is hoped that others will become interested and that eventually all the towns in Berkshire County will be united in one health district. In this way the cost of administration will be spread over a population of 60,000 which would make it possible to carry on a modern health program in this entire area at a minimum cost.

The Nashoba Health District.—Fourteen towns centering about Ayer, with a population of 21,894, make up this District. Much progress toward perfecting the organization and strengthening the program has been accomplished. The people in the area have become more interested in modern health procedures as a result of demonstrations and actual service performed. At the town meetings in 1935 each town will vote on the question of joining together and forming an official Health District. This plan will involve a complete take-over on January 1, 1936, of the work which has been carried on under the sponsorship of the Commonwealth Fund as a demonstration.

Local Board of Health Records.—Many boards of health have been very lax in keeping their records of communicable disease. This has made it difficult to develop future control programs, especially in regard to diphtheria immunization. Through the generosity of the Commonwealth Fund it has been possible to have a member of the Department staff visit boards of health to analyze their records and assist in establishing a better system. Besides the towns in the Southern Berkshire Health District and the Nashoba area, sixteen cities and towns have been given such assistance, and this has been much appreciated by the officials. We are fortunate to have funds available to continue this important service another year.

State Health Districts.—A re-alignment of areas has been made whereby an additional district has been created, increasing the number from six to seven. This was desirable because the Metropolitan District as it existed was too large for adequate supervision by one health officer. The southern section of this district and some of the adjoining towns to the south were made into a new district. The District Health Officers have carried on their work very efficiently. They meet with the Director of the Division of Communicable Diseases once in two months and talk over their problems. At these meetings men prominent in some special field of health work or who have discovered some new method of procedure relating to public health are invited to address them. Visits are also made to the South Department of the Boston City Hospital where Dr. Place kindly shows them unusual cases of communicable disease and discusses diagnosis and treatment. In this way they are kept informed of the latest developments in the field of public health.

III. Communicable Disease

The total number of cases of communicable disease reported was 113,559 as compared with 83,288 in 1933. This increase was due to the widespread prevalence of measles early in the year in the central and eastern sections of the State. The other diseases that showed an increase were chicken pox, bacillary dysentery, German measles, and whooping cough. The only one of these that contributed appreciably to the death rate was whooping cough. This disease has been the leading cause of death from communicable diseases in children under five for years. As such, it merits greater attention from public health authorities. Gratifying declines were registered in several of the more serious diseases. Diphtheria and typhoid reached the lowest levels ever recorded and there was a reduction of nearly 200 deaths from tuberculosis. For the first time deaths from pulmonary tuberculosis fell below the 2,000 mark, and the death rate from all forms of the disease was below 50 per 100,000. Infantile paralysis in 1934 was at the third lowest level ever recorded. Scarlet fever reached the lowest level since 1922. No case of smallpox has appeared in the State since February, 1932.

Outbreaks.—No cases of typhoid, septic sore throat, or scarlet fever have been traced to milk during the year. Fifteen cases of undulant fever have been reported and in almost all there was a history of consumption of raw milk from a herd known to be infected with contagious abortion. More than the usual number of outbreaks of gastro-enteritis have been investigated. The most extensive and explosive outbreak of this disease was traced to a polluted water supply produced by unsupervised workmen who were clearing brush on the watershed.

Anterior Poliomyelitis (Infantile Paralysis).—This disease established a new low level for deaths and, with the exception of 1932, the lowest number of reported cases. Our supply of serum was ample without resorting to additional bleeding clinics. Consultants of the Department saw 36 cases with the attending physician.

Diphtheria.—This disease furnished the most striking example of the benefit of immunization. The incidence of diphtheria in 1934 was barely one-fifteenth of the incidence in 1923, when diphtheria immunization began on a large scale in Massachusetts. Only 629 cases were reported as contrasted with 1,041 the previous year. There was a reduction of about 40 per cent in cases, and 42 per cent in deaths. More and more boards of health are recognizing their responsibility in providing for diphtheria immunization. To aid them in getting appropriations for carrying on this work, letters were sent out near the end of the year to every municipality urging that an item be included in their budgets for this specific purpose. A survey was made by the Division of Child Hygiene of school health work and it was found that the average percentage of children immunized against diphtheria in 174 cities and towns was 48 per cent. This varied from 64 per cent in the larger cities to 41 per cent in the small towns. As two-thirds of the cases of diphtheria are in pre-school children, the greatest effort should be made to protect this group. For the use of boards of health cards are furnished by the Department with the suggestion that they be sent to the parents of all infants when six months old, calling attention to the advantages of immunization and requesting that they take their child to their physician to have it done. If this procedure could be made universal, public clinics would be unnecessary. The family physician would do the preventive work and diphtheria would cease to be a public health problem.

Dysentery, Amebic.—There were but 31 cases reported during the year, which is 8 more than in 1933. Of these, a few were traceable to an infection in Chicago during the previous summer but so far as is known there have been no secondary cases. The publicity attending the Chicago outbreak resulted in physicians studying their cases more closely and some laboratories doing routine stool examinations. For this reason perhaps some cases who were simply carriers were diagnosed as having amebic dysentery, with some associated condition which produced symptoms. The diagnostic service which was set up last year as an emergency in conjunction with the Department of Tropical Medicine in the Harvard Medical School has now been transferred to the Bacteriological Laboratory which is now prepared to examine specimens both for the vegetative form of the ameba and for cysts.

Dysentery, Bacillary.—The greatly increased number of cases of bacillary dysentery is due to the occurrence of several institutional outbreaks. In one of these institutions, several deaths occurred in previously debilitated patients. In some institutions the condition was recognized promptly and by active precautionary measures an extensive outbreak was averted. In all of these instances dysentery bacilli of the Hiss-Y strain were isolated. Although no figures as to the incidence of bacillary dysentery in the general population are available, there is very strong evidence that the disease occurs much more frequently than is suggested by the morbidity reports. In the healthy young adult an infection with the Hiss-Y strain apparently produces nothing more than a diarrhea of two or three days duration. Many of the idiopathic diarrheas which may occur from time to time are in reality bacillary dysentery which entirely escapes recognition unless it happens to attack a small child, in whom the classical symptoms are produced.

Encephalitis Lethargica.—In last year's report reference was made to the outbreak of encephalitis lethargica that occurred in and around St. Louis, the disease being somewhat different from the type of encephalitis usually encountered. The past year has seen the appearance of sporadic cases in this State but there has been no evidence of localization.

Epidemic Cerebrospinal Meningitis.—Although the reported incidence of this disease was somewhat higher than for last year, the number of deaths reached the second lowest figure ever recorded. This record is probably due more to good fortune than to good management as there is nothing that can be done in our present state of knowledge to guard against this disease.

Gastro-enteritis.—During the past year there has come to the attention of the Department an increasing number of outbreaks of gastro-enteritis. Although two or three of these were of an explosive nature definitely associated with food, the majority presented themselves as nothing more than unusual incidence of gastro-intestinal disturbances in a community within a relatively short period of time. These were the type of cases that are frequently referred to as "intestinal grippe." Although there is no evidence that the etiologic agent is related to the organism that causes the usual type of grippe, there is increasing evidence that there is some sort of gastro-enteritis that is spread through the respiratory tract. It is popular to attribute these incidents to a water supply as was done in three different communities, yet examination of the water showed no evidence of pollution and the distribution of the cases over a period of one to two months would definitely suggest some other mode of spread. In Fitchburg an extensive and explosive outbreak of gastro-enteritis developed as a result of unquestioned pollution of the water supply. It occurred immediately after a heavy thaw with its attendant run-off and was unquestionably due to pollution of the watershed through C. W. A. workers who, in spite of warnings from this Department, had been permitted to work on the watershed without adequate precautions being taken as to the disposal of excreta. Several thousand persons were involved in this outbreak, which, however, was of but short duration. This illustrates the necessity of carefully supervising workmen on watersheds. If by any chance such a worker should be a typhoid carrier, a serious epidemic of that disease might result.

Measles.—The past year has seen the highest incidence of measles ever reported, reaching a total of 44,817. The disease began to appear around Worcester during the closing months of 1933, becoming widespread in that city and all surrounding towns. As the year closed it had appeared in the Metropolitan area and was increasing rapidly, reaching its peak in March, when almost 10,000 cases were reported. The final result was an epidemic that swept the eastern half of the State. The high incidence of measles brought with it a sharp increase in the death rate. On the other hand, there is considerable satisfaction in the thought that the case fatality rate was lower than in any previous year except 1933. During this epidemic it was possible for Dr. McKhann of the Children's Hospital to gather further data as to the efficacy of placental extract. The results obtained in the prevention or modification of measles among those definitely exposed to the disease were so encouraging as to warrant a more extensive study in future years.

Pneumonia, Lobar.—1934 has seen the end of the wave of lobar pneumonia which went through the winter of 1933–34. The latter part of the year has seen the disease back at a fairly normal figure.

Rabies.—The past year has seen a definite increase in the prevalence of rabies throughout the eastern part of the State. Two hundred and fifty-one positive heads were reported from the laboratory, as compared with 144 for the previous year. These have been very largely in the Metropolitan area, spreading northward into the eastern section of Middlesex County and the western border of Essex County. One human case of rabies developed, the victim being a five year old child, bitten on the face by a dog that was not located. The case was not officially reported as one of dog bite nor was antirabic treatment given. Another child, bitten by a proven rabid dog, died of a condition which was at first thought to be rabies but upon review was probably an encephalitis associated with the vaccine. This is one of the very rare complications which may occur as a result of such treatment. Although it occurs but once in several thousand instances, it constitutes but another reason why more active measures should be exercised to control the spread of rabies among dogs and thereby avoid the necessity of subjecting persons to the necessary inoculations.

Evidence is accumulating in this State that the annual one-dose injection confers protection on a dog for a year. It is certain that the bulk of those so treated are actually protected even though an occasional failure may be recorded. Such work has been carried on in quite a number of communities. In some the conduct of a dog inoculation clinic has been coordinated with a restraint order, which has provided for exemption of those dogs recently vaccinated. This is probably the most effective type of restraint order as the ordinary ninety day restraint order is so irksome to dog owners as to be marked more by its violation than by its observance. There has been some agitation in favor of compulsory inoculation of all dogs. This, however, is difficult to carry out. It would probably be more practical to provide for free inoculation of dogs as partial return for the license fee. The 1934 Legislature completed an elaborate revision of the dog laws. Included in that was a provision whereby a city or town will be reimbursed by the county for both the cost of the vaccine and the treatment to a sum not to exceed $50 per individual case. This change will be of considerable benefit to the medical profession as in many instances the physician was in the position in the past of having cared for several members of a family bitten or exposed to a dog without receiving any remuneration whatever for his services. The law also empowers counties to enter into contracts for vaccine to be furnished to their respective cities and towns. This may result in a considerable saving.

Scarlet Fever.—With only 8,391 cases reported, scarlet fever reached the lowest recorded level since 1922. At the same time the deaths have fallen to 76 which will constitute the second lowest death rate ever recorded for scarlet fever. Immunization studies which were begun in the fall of 1931 have been pursued even more actively during 1934, using as an immunizing agent a formalized toxin solution. Through the use of this solution, it has been possible to obtain in about 70 per cent of the children so treated a level of immunity sufficient to cause a negative Dick test. Immunization with this solution has been continued as a routine procedure in schools for the feeble-minded and in the Department's hospitals for childhood tuberculosis. In some orphanages and schools children have received this treatment, and the studies have been extended to certain groups of nurses. In Wellesley, East Bridgewater, and Framingham community programs have been begun, and as the year closed a limited community program is being carried on in the city of Worcester. The effect of this immunization as measured by the prevention of scarlet fever in those so treated has been extremely encouraging, no case having occurred in a child immunized to the point of a negative Dick test. This solution produces reactions which are so mild as compared with those following the usual scarlet fever immunizing agent that if its effectiveness can be demonstrated there seems little doubt as to its popular acceptance.

Septic Sore Throat.—Two hundred and one sporadic cases of septic sore throat have been reported. The year was characterized by an apparent absence of any milk-borne outbreaks of this disease.

Smallpox.—Nearly three years have elapsed since a case of smallpox has been reported in Massachusetts. The last one occurred in Fitchburg in February, 1932. From the point of view of the public health, this is extremely gratifying provided, however, it does not lull us into a sense of complacent assurance that this freedom from the disease can be maintained without resorting to continued vaccination. The history of smallpox is full of such remissions and it must not be used as an excuse for being deceived by the present situation.

Tuberculosis.—The last year has seen a decline in both pulmonary and extrapulmonary deaths to figures lower than ever heretofore obtained. For the first time in the history of the State pulmonary deaths fell below 2,000, and the death rate from tuberculosis, all forms, below 50 per 100,000. At the same time there was a slight increase in the total cases reported which suggests a general improvement in diagnostic facilities throughout the State and their use by the practicing physicians. Through the out-patient departments and consultation clinics, the four State sanatoria examined 5,640 patients in 1934, an increase of 276 examinations over the previous year. The important role which thoracic surgery now plays in the treatment of pulmonary tuberculosis has made it necessary to provide for this essential service on a more permanent basis. The phrenic nerve surgery and bronchoscopic examinations are done in the institutions. Patients who require thoracoplasty have been sent to the Massachusetts General Hospital and in such cases the Board of Health has paid the Hospital at the same rate it had been paying the sanatorium. As this involves a loss to the Hospital of approximately $3 per day for each patient admitted and the present ward facilities are not sufficient to insure prompt admission of sanatorium cases, it has become necessary to make a more comprehensive plan for providing major thoracic surgery for each patient. A tentative arrangement has been worked out with the Hospital by which a sufficient number of beds will be made available at ward rates plus a very modest fee for the surgeon, and the Department is asking an appropriation sufficient to meet anticipated charges on such an arrangement.

In order to relieve the long waiting list at the Middlesex County Sanatorium and to make tuberculosis beds in the State sanatoria more freely available to patients in all parts of the Commonwealth, the statute fixing the rate at Rutland was amended by the last Legislature to permit a charge to cities and towns of less than the actual cost of maintenance. A rate of $10.50 per week was subsequently set by the Department.

For some years it has been obvious that more adequate facilities will have to be provided for the treatment of tuberculosis in the western part of the State. The institutions in that territory have neither the capacity nor the equipment necessary for the modern treatment of tuberculosis and as a result patients are reluctant to accept hospitalization. To meet this need, the construction of a 250-bed unit for adult patients with pulmonary tuberculosis on the grounds of the Westfield State Sanatorium has been recommended and a bill providing for this will be introduced into the Legislature. By utilizing the existing facilities, a sanatorium could be constructed and maintained at a minimum cost and would be very acceptable to the territory served. When such provision is made, it would no longer be necessary to continue the small sanatoria at Springfield, Holyoke and Chicopee, and the Hampshire County Sanatorium at Haydenville would no longer be needed. As to whether or not it is continued would depend entirely upon the action of the Hampshire County Commissioners.

The other sections of the State with the exception of Middlesex and Bristol Counties appear to have sufficient beds for their needs. It is to be hoped that the additional buildings planned for the Middlesex County Sanatorium will be constructed in the near future.

The Ten Year Program came to an end this year and decentralization of the work has begun very satisfactorily. Most of the county sanatoria have started or are arranging to begin examinations soon and some of the larger cities have already taken over the work. The State sanatoria are dividing the work with the counties according to geographical location. Children who have been diagnosed during the past years as having tuberculosis or are suspects will be followed up with annual examinations by the State clinic group. A statistical summary of the ten years' work in the school clinics is covered in the report of the Director of the Division of Tuberculosis. Briefly, we may say that 400,000 school children have been examined. These clinics have been held in practically every city and town in the Commonwealth and in some of them twice. This extensive program has brought the subject of tuberculosis, its diagnosis and treatment to the attention of parents, teachers, nurses and doctors and has created, we believe, a consciousness of the problem of tuberculosis which is bound to be of the greatest value in the application of further control measures. It is practical health education.

Typhoid Fever.—The incidence of typhoid fever continued to decline during 1934, reaching a record low figure both for cases and deaths. There were but 134 cases reported as compared with 162 for last year. At the same time the deaths numbered only 13 as compared with 22 the previous year. No cases were recognized that were directly traceable to either water or milk. The largest local outbreak during the year occurred in Mansfield where four cases occurred simultaneously. Although it was virtually impossible to obtain accurate information, there is no question that these cases were related and directly traceable to a carrier.

The list of known typhoid carriers has grown from 91 at the beginning of the year to 98. Two carriers died from a condition having no relation to their carrier state; two underwent operations in the hopes of curing their condition; and four carriers were removed from the list as cured following gall bladder removal. Carriers found upon investigation of reported cases were 13, making a rate of 9.8 per 100 cases.

Of particular interest was an investigation carried out in Fall River of routine culturing of typhoid fever cases reported during recent years. Two new carriers were found in this way. The cases of typhoid fever are now so few that it is perfectly feasible to carry out such a program in any community.

Undulant Fever.—Fifteen cases of undulant fever were reported as compared with 11 the previous year. In all instances the source of infection was apparently raw milk. Several of the victims during the past year have been sadly disillusioned as to raw milk, realizing for the first time apparently that milk from a model dairy might be a vehicle for the transmission of disease. The incidence of contagious abortion among the dairy cattle of the State is very high and the problem of eliminating this disease from the herds is one that is being given a great deal of study by the Department of Agriculture. The possibility of infection from this source is another argument for the general pasteurization of milk.

Whooping Cough.—With 12,659 cases of whooping cough reported for the year, this disease reached a higher incidence than ever previously recorded. The case fatality, however, was extremely low. Although the death rate shows some decline, whooping cough still causes more deaths in children under five than any one of the other communicable diseases. It is to be hoped that a vaccine may be developed that will prevent or modify this disease as it is now one of the most serious public health problems.

Gonorrhea and Syphilis.—About 6,500 cases of gonorrhea and 4,500 of syphilis have been reported this year, which is practically the same number as 1933. No special effort has been made to stimulate reporting or otherwise the number might have been considerably increased. Two hundred and seventy cities and towns have been represented in the reported cases. The total visits to the fourteen State-aided clinics have shown an increase of 2.6 per cent which indicates a tendency on the part of the patient to remain under treatment longer and visit the clinic more regularly. Some of the clinics have been reorganized and in one instance an assistant has been added to the staff. There is a gratifying tendency on the part of boards of health of the smaller communities to recognize their obligation to furnish treatment for patients with gonorrhea and syphilis when they cannot employ a private physician. Apparently the established clinics are receiving considerable revenue from this source.

Arsenicals.—There has been an increase in the demand for arsenicals. About 5,400 grams have been distributed at a cost of approximately $12,000.

Many lectures on the subject of gonorrhea and syphilis have been given and a large amount of literature distributed.

Division of Biologic Laboratories.—The distribution of biologic products varies somewhat with the incidence of disease. With the decline in diphtheria there is a lessening demand for antitoxin and only about half of the amount is used now as compared with five years ago. Diphtheria toxoid is rapidly replacing toxin-antitoxin. In one month recently the amount of toxoid exceeded that of toxin-antitoxin being distributed. It is probable that in the near future the manufacture and distribution of toxin-antitoxin can be discontinued.

The use of scarlet fever convalescent serum has increased and more towns have availed themselves of the laboratory service in processing blood which they obtained from donors. Placental extract is now prepared at the laboratory for the study being carried on in cooperation with the Department of Pediatrics of the Harvard Medical School. The use of tuberculin for diagnostic purposes has materially increased. Scarlet fever toxoid is prepared for the experimental work being carried on to determine its value as an immunizing agent. Work is being continued on the production of a satisfactory alum precipitated diphtheria toxoid, but as yet none of this material from our laboratory is available for use. A distinct improvement has been made in the antipneumococcic serum. The product is more concentrated and shows less chill-producing qualities.

The Wassermann Laboratory reports an increase in the total number of specimens examined for syphilis, the complement fixation tests for gonorrhea, examination of dogs' heads for rabies, and agglutination tests for the bacillus abortus. On April 1st the routine use of the Wassermann tests was discontinued and the Hinton test made the standard method for the examination of blood for syphilis. This change in method permitted the examination of an increased number of specimens with the same personnel and the number of positive diagnoses was increased.

Bacteriological Laboratory.—The demands on the laboratory have been getting heavier each year. More use is made of it by physicians notwithstanding the decline in the incidence of diphtheria and typhoid. The outbreaks of dysentery in the institutions during the last year and the more thorough search for typhoid carriers greatly increased the number of stool specimens sent in for examination. The studies of the different methods of pneumococcus typing continue and it has been shown conclusively that the Neufeld method can be substituted for other methods without sacrificing accuracy. This is of great importance as the type of pneumococcus in a specimen can be determined in a very few minutes. Delay is thus avoided and the administration of serum restricted to Types I and II cases.

IV. Non-Communicable Disease

Division of Child Hygiene.—The educational work carried on by this Division is varied but it all has an important bearing on some phase of child health. Beginning with pre-natal and post-natal advice to parents it follows on through the pre-school period with Well Child Conferences and mothers' classes. Then come the Summer Round-Ups to see that the children are ready to enter school without physical handicaps and that they are vaccinated against smallpox and immunized against diphtheria. Then health education is carried on with the child through teaching hygiene in the schools. The examination by the physician is practical health education if properly and adequately carried out. The supervision of school lunches to see that suitable foods are provided and that the child is taught how to make proper selection is an opportunity to teach nutrition which should not be overlooked. Then examination of the teeth should be used to convey to the child the information that cavities and unclean teeth are an unhealthy condition of one of the most important organs of the body which may interfere with growth and development and possibly cause serious disease. An interesting project in the field of school hygiene was carried out in giving 2,000 sixth grade children in different types of communities in the State a "Health Awareness" test prepared by the American Child Health Association. The purpose of this is to determine the value of methods and materials used in health education. A bulletin called "Contact" for distribution to school superintendents and school physicians is being issued four or five times a year, and serves as a medium for bringing to the attention of these officials the newer developments in school medical service.

Nutrition Service.—The services of the nutritionists have been much in demand by school officials to give advice in regard to school lunches and by welfare departments to supervise food budgets. Early in the year a school lunch committee was appointed made up of the Chairman of the Child Welfare Division of the Massachusetts Federation of Women's Clubs, representatives of the Department of Education, and of the Extension Service of the Massachusetts State College, with the Consultant in Nutrition of the Department as Secretary. Surveys were made by responsible women in the local communities for the purpose of finding the needs and to share the responsibility in meeting them. This investigation was made in about 170 cities and towns. When the figures were studied from the returns of the first 47,000 children either bringing their lunches or buying them at school, it was found that only one child out of four had milk, only one out of five had fruits and vegetables, only one out of seven had dark bread, only one out of five had as long as twenty minutes for eating lunch, and only one out of nine was getting a hot dish. This indicated that children were eating unbalanced lunches, even though nineteen types of organizations were giving assistance. A report was sent to each superintendent of schools concerned, noting the needs found and suggesting his appointing a committee to work with him to meet these needs. The results thus far have been that more needy children have been supplied with lunches, more responsible local organizations are working toward improving the school lunches, and more nutrition education of children, parents and teachers is being carried on.

Courses and lectures were given on nutrition to home economics teachers and nurses. The summer camps for children affiliated with the Massachusetts Tuberculosis League were given more adequate supervision this year than ever before. On request from the camp director, a nutritionist would spend two or three days observing and assisting in the preparation of meals. On the basis of our observations recommendations were then made for such changes and improvements as seemed desirable.

Early in the year the Consultant in Nutrition was appointed as an adviser to the State F. E. R. A. She has been called upon many times for advice as to the best way to utilize foods sent in to the State for distribution and as to suitable food budgets to be supplied to recipients of welfare relief. A Buying Guide for families on welfare aid and for persons with much reduced food allowances was prepared and distributed. Much assistance has been rendered to many welfare departments in different sections of the State in planning food allowances and methods of distribution.

Dental Nutrition Study.—This is the third year that a dental nutrition study has been carried on in cooperation with Doctors Howe and Eliot of the Forsyth Infirmary on the children patients in the State Sanatoria. Groups of children have been followed over long periods to observe the effects of adding tomato juice with and without the addition of Vitamins A and D obtained from haliver oil. In several communities where nutritionists are available there has been an effort made to consider cases of active caries as needing the aid of nutritional follow-up but the problem is so large that only the worst cases can be covered.

An important service has been contributed by the Committee on Public Relations of the Massachusetts Dental Society who have asked local dentists to furnish free examinations and consultations to members of 4-H clubs. The use of the dental certificate plan in schools is being urged and is meeting with favor in many communities. Splendid service is being given by the dental clinics and eleven new traveling clinics were established during the year. The dental health education and dental clinic service have developed rapidly in the rural sections. There is evidence of a steady growth in all phases of dental hygiene.

Health Education.—More time was spent in consultation with visiting nursing associations in the development of local publicity programs. Lectures were given to many groups; pamphlets, posters and exhibits were prepared and widely used in the State. Four special numbers of the Commonhealth were published, the subjects covered being "The Handicapped," "Adult Hygiene," "Diabetes," and "Health Education." The inclusion of many important papers in these issues greatly increased the demand and made it necessary to print much larger editions.

Public Health Nursing.—A series of lectures was given in nurses' training schools covering subjects pertaining to the control of communicable disease and other phases of public health. Tuberculosis nursing service has been featured in several communities and aid given to local nurses in the development of their programs for case finding and systematizing their work. Assistance has been given in the scarlet fever immunization clinics. Public health nursing institutes were held in six different areas in the State. The general subjects discussed were child health, and school and general public health nursing. The attendance and interest shown were very gratifying.

Only the high lights of the many interesting things done by this Division can be mentioned in an abstract. A detailed account of the work will be published in the complete report.

Division of Adult Hygiene.—The Division of Adult Hygiene, although devoting most of its time to the cancer program, has given some study and has issued pamphlets on diabetes, rheumatism, heart disease, and other chronic diseases. Over 25,000 pieces of literature have been distributed. One issue of "The Commonhealth" was devoted to "Adult Hygiene." The Health Forum, which combines newspaper and radio activities, has been changed during the year; no answers to questions requesting medical advice are given. Instead, two medical topics are discussed each week over the radio. Both of these articles are printed weekly in the Boston Globe and one is sent to 74 newspapers throughout the State. A new series of radio programs entitled "The Health Review" was started in January. Broadcasts sponsored by the Massachusetts Medical Society continued throughout the year. Altogether, 143 broadcasts have been given.

Cancer.—The Division of Adult Hygiene has devoted the greater part of the time to the cancer program. One issue of "The Commonhealth" was devoted entirely to "Cancer" and another to "Diabetes." Both of these were prepared for general distribution to all physicians in the State as well as to the regular mailing list. A Cancer Clinic Bulletin, designed primarily for physicians working in the cancer clinics is now mailed to about one-fourth of the physicians in the State. It contains abstracts of articles on cancer and items of interest regarding the cancer program. Experience in the cancer clinics has indicated that the publicity methods used have not accomplished the desired results and therefore the program has been changed to lessened activity through the newspapers and to effect a more concerted drive for education of the laity through the medical profession. The study started last year of the death records being collected on cancer and tuberculosis has been continued. The investigation into the etiology of cancer and the evaluation of cancer mortality records, aided by a grant from the Rockefeller Foundation, is progressing. A study of cancer patients from admission to death is being carried on. A survey of the cancer clinics indicates that the bulk of cancer patients are being referred to the clinics by physicians. There has been a steady increase in this trend since the inception of the program. State-aided clinics are being maintained in Pittsfield, North Adams, Boston, Brockton, Lawrence, Lowell, Lynn, New Bedford, Newton, Springfield, Worcester, Fitchburg, Gardner, and Greenfield.

Pondville Hospital.—Through the Emergency Public Works Commission funds have been made available for a much needed service and surgical building and a 25-bed addition at Pondville. It is expected that these buildings will be ready for occupancy by August, 1935. This will furnish a thoroughly modern operating unit, increase the capacity of the hospital by 25 beds, and relieve the present congestion in the out-patient department. Although there has been a continued growth in all services at Pondville during the year, it is evident that additional service to cancer patients must wait for the completion of the new buildings now under construction. There were 1,222 admissions, 19 more than last year. The out-patient visits rose to a new total of 4,619. The average length of hospitalization was further reduced from 37.1 to 33.8 days in an attempt to shorten the waiting list for admission, but we believe that any further reduction in the average period of hospital treatment for cancer patients is not desirable from the standpoint of the patients. The increase in all branches of medical work has been assisted by the addition of one physician and three nurses to the resident staff. Operations increased 14 per cent and autopsies 12 per cent during the year. The need for additional employees' quarters was recognized by the engineers of the Emergency Planning Board who recommended a separate dormitory building. The request for a 100-bed dormitory has accordingly been included in the 1935 budget.

V. Environmental Control

The Division of Sanitary Engineering has received more requests for advice than ever before. The subjects covered related to municipal water supplies, private water supplies through local boards of health, water supplies of schools and camps, sources of ice supply, bathing and swimming pools, shellfish, pollution of streams, sewerage and sewage disposal, Civilian Conservation Corps camps, and miscellaneous matters. This number is about 37 per cent in excess of the number of applications received during the corresponding period last year. All of these applications required field investigations by engineers and chemical analyses, or bacterial examinations, or both, by the Water and Sewage Laboratories or the Lawrence Experiment Station.

The rainfall for the year 1934 as recorded at seven rainfall stations throughout the State, which are under the supervision of this Division, was 44.05 inches, which is only 0.57 inches less than normal.

An examination of the records submitted by the Metropolitan Water District shows that the water consumption of this district during the year increased about 6.8 per cent over that for the same period of 1933. There were no shortages in any of the sources of water supply in the State during the year and it was not necessary for the Metropolitan District Water Supply Commission to divert water through its tunnel from the Ware River to the Wachusett Reservoir, the yield of this reservoir and the other sources of supply of the district being sufficient to meet all requirements and allow a wastage over the dam at Clinton from March 31 to about July 1. The progress in the construction of the new sources of water supply for the Metropolitan Water District in connection with the diversion of the waters of the Swift and Ware rivers has been satisfactory during the year and at the present time the tunnel that will convey these waters to the Wachusett Reservoir is complete except for about 1,000 feet of lining.

During the year public water supplies were introduced in the towns of Paxton and Townsend and in the Barnstable Village section of Barnstable. Consequently, the number of cities and towns having public water supplies is now 241. There have been a number of important improvements in some of the water supplies and others are being contemplated.

As a result of the reasonably normal rainfall, the flow of streams has not been sufficiently low to cause much complaint from pollution, and in general the streams throughout the State, with the exception of the North River in Salem and Peabody, have not been as seriously polluted as in certain past years. The Department has been much concerned over the pollution of the Charles River from the disposal of the sewage of the town of Milford, and as a result of communications and numerous conferences the local officials agreed to the construction of additional sewage disposal works in accordance with plans approved by the Department. In the report of the Department for 1933, mention was made of the pollution of the Nashua River and the Superior Court filed a decree requiring the city of Leominster to establish sewage disposal works. Plans also were approved during the year for a trunk sewer and sewage treatment works in North Adams, and construction is now well under way.

Much of the time of this Division has been taken up with the investigation of various projects for construction through Federal agencies, viz.: the Public Works Administration, the Civil Works Administration, and the Federal Emergency Relief Administration. Water and sewerage works have been approved for construction by the Federal authorities in accordance with their program. Eleven of these were in State institutions, the total estimated cost of which was $308,300. Eighteen of these projects were for cities and towns, the total estimated cost being $1,830,000. There were also twelve C.W.A. or F.E.R.A. projects with an estimated cost of $1,389,600.

In connection with the institutions under the supervision of this Department, the Engineering Division prepared plans and supervised the construction of additional sewage filters at the Lakeville State Sanatorium and at the Westfield State Sanatorium. At the Rutland State Sanatorium sewers and drains were constructed to eliminate surface water from the sanitary sewer discharging into the new Rutland-Holden-Worcester sewer which has recently been completed by the Metropolitan District Water Supply Commission to prevent pollution of the water of the Metropolitan Water District. Sprinklers for fire protection purposes were installed at the Rutland, Lakeville and North Reading State Sanatoria.

During the past year this Division has carried out two investigations jointly with the Department of Public Works. One of these investigations was in connection with the condition of Lake Quinsigamond and the other related to the South Essex Sewerage District. Reports required under these resolves have been signed jointly by this Department and the Department of Public Works and submitted to the Legislature.

Throughout the year a large number of samples of water have been collected for bacterial examination from sources of water supply used at the Civilian Conservation Corps camps, and in addition the Department has assisted by advising in matters of sewage and refuse disposal.

The Division has carried on the usual activities relating to shellfish and drainage matters. In connection with the former, there has been much activity relative to the shipment of shellfish into the State. Under the new law enacted in 1933, all persons dealing in shellfish commercially are required to have certificates issued by the Supervisor of Marine Fisheries in connection with which inspections are now made by the Division of Sanitary Engineering before certificates for shucked stock are issued. Under this agreement between the Supervisor and this Division, nearly 600 inspections have been made of shucking plants, and the Supervisor has been notified when the shucking plants are in proper sanitary condition in order that the necessary certificates might be issued. This has been the first full year when the Department has had the opportunity to supervise shellfish shucking establishments, and this is believed to be one of the most important steps thus far taken in cleaning up insanitary shucking establishments.

The drainage problems have been under the direction of the State Reclamation Board, the chairman of which is a member of the staff of the Engineering Division. Much drainage work has been carried out in the salt marsh areas for the purpose of mosquito control. Most of this work has been financed under funds appropriated for the relief of unemployment.

The Division has also caused examinations to be made of sources of water supply at many schoolhouses, especially in the Berkshire section of the State. Many of them visited were found to have sources of water supply of questionable quality.

During the period from January 1 to November 30, inclusive, the Water and Sewage Laboratories made 8,003 chemical and 2,634 microscopical analyses, and in carrying on the routine and research work 2,721 additional examinations. At the Lawrence Experiment Station 2,566 chemical analyses were made and 8,215 bacterial, including 474 shellfish examinations and 319 analyses of sand. Much of the time of the Chief of the Laboratory at the Lawrence Experiment Station was used in the supervision of experiments made in connection with the treatment of sewage and trade wastes of the South Essex Sewerage District. Certain studies were made during the year relative to the disposal of distillery wastes in Clinton. As a result of the work of the Lawrence Experiment Station and the investigations by the engineers, the Attorney General on application by the Department instituted court action against the Clinton Distillery and as a result an agreement was made between the Distillery and the courts to prevent the further discharge of these objectionable wastes into the sewerage system of the town of Clinton.

Close supervision has been maintained by the Lawrence Experiment Station in connection with the plants operated in Newburyport, Scituate and Plymouth for the treatment of shellfish by chlorination. The experimental work of the Station has been continued and many new studies are under way, the details of which will be given in the complete report of the Division.

Division of Food and Drugs.—During the fiscal year there were collected and examined 5,164 samples of milk chemically and 4,104 bacteriologically. There were also 266 samples of ice cream examined for bacteria. There were 2,674 samples of food examined and 347 samples of drugs, and the police departments submitted 1,300 samples of liquor. The liquor samples are considerably less than the number submitted during prohibition.

There was an unusual amount of oleomargarine sold as butter. This material was shipped in interstate commerce in compliance with the law and was stored in a warehouse in Boston. It was then transferred to a place located outside of Boston, was colored, and sold in retail stores as butter. After much investigation in cooperation with Federal officers, the cases were traced and brought to court.

With the passage of the new frozen dessert law, a new duty was placed upon the Department, namely, the supervision of the manufacture of this type of food, together with the granting of permits to manufacturers of such food located without the Commonwealth. Rules and regulations were drawn up a short time after the law became effective, and these were adopted by the Council. Investigation of the sanitary condition of these plants showed that they were far from being as clean as the pasteurizing plants at the time the milk pasteurization law went into effect. Apparently very little inspection as to sanitary conditions in the ice cream making plants had been made by the local boards of health.

There was considerable increase in the mattress inspection work, probably due in some measure to the introduction of a bill requesting the transfer of mattress inspection from this Department to the Department of Labor and Industries. This bill was vetoed by the Governor but it is probable that the mattress manufacturers, anticipating the transfer, thought that it would take considerable time to develop an organization to enforce the law and make ready to take advantage of this condition. Several manufacturers were prosecuted and convictions obtained.

Pasteurization plants have been inspected as usual, and violations have not been so extensive as they have been in the past. On the whole, this work is carried on in accordance with law and with reasonably good sanitary practice.

VI. Personnel

For the first time in many years there has been a change in the membership of the Public Health Council. Because of his many other obligations Dr. Roger I. Lee felt it necessary to resign, in November. Dr. Richard M. Smith of Boston was appointed by the Governor to fill this vacancy. Dr. Smith is a pediatrician well-known throughout the country, and his advice and guidance will be of inestimable value in the formulation of program and policies, especially of the Division of Child Hygiene of the Department.

In May the District Health Officer districts were increased in number from six to seven by a division of the Metropolitan Area. Dr. George M. Sullivan, formerly Superintendent of the Pondville Hospital, who was District Health Officer in the Northeastern District at one time, was appointed as District Health Officer of the newly created South Metropolitan District.

On June 1 Miss Ada Boone Coffey, Chief Consultant in Public Health Nursing, was granted a leave of absence because of illness, and had been unable to return at the end of the fiscal year. This vacancy was not filled temporarily because of the difficulty in obtaining a suitably qualified person and the hope that Miss Coffey might be able to resume the work in which she was so much interested.

Dr. Samuel B. Kirkwood was appointed on June 1 to fill the vacancy in the position of Epidemiologist in the Division of Tuberculosis caused by the resignation of Dr. Raymond Johnson.

There have been many changes in the staff of the Chadwick Clinics during the year, most of these due to the termination on June 30 of the ten-year period for which the work was undertaken and the resulting curtailment of the State's activity in this work. On December 31, 1933, Miss Sallie Bohl, Supervising Tuberculosis Field Nurse, resigned and Miss Katherine F. Mullane was promoted to this position. Miss Mildred Givan was appointed temporarily as Tuberculosis Field Nurse until June 30 to fill the vacancy caused by Miss Mullane's promotion, as this position was one of those to be abolished with the termination of the Chadwick Clinics. The positions of Dr. Charles E. Gill, Supervisor of Tuberculosis Clinics, Dr. Francis H. MacCarthy, Child Welfare Physician, and Miss Katherine B. O'Connor, Supervising Tuberculosis Field Nurse, were also abolished. Miss Catherine Leamy's position as Public Health Nutrition Worker was another to terminate with the ending of the clinics, but Miss Leamy was transferred to the Division of Child Hygiene as a much needed additional nutritionist on the staff of that Division. Miss Leamy is now on leave of absence for a year (from September, 1934, to September, 1935) for purposes of study and her work is being covered by Miss Helen E. Inman.

Dr. William R. Martin, Child Welfare Physician, who had been retained on the follow-up work of the Chadwick Clinics, resigned on October 31 and Dr. Harry C. Low was appointed to fill his position.

Dr. Gail Edwards was appointed to the newly created position of Laboratory Coordinator in the Division of Sanitary Engineering on August 1.

On June 1 Mr. George Adams was promoted to the rating of Chief of Laboratory and Mr. Joseph A. McCarthy was promoted to Senior Chemist at the Lawrence Experiment Station of the Division of Sanitary Engineering.

On June 6 Dr. Chester S. Stirrett, Veterinary Food Inspector in the Division of Food and Drugs, resigned. With a slight reassignment of the duties of the Inspectors of this Division it was possible to have the requirement of veterinary training for this position eliminated. On July 1 Mr. Thomas L. Boland, who has been employed by the Department for a number of years and who had successfully passed the Food Inspectors' examination, was promoted to this vacancy.

An additional position of Food Inspector was created in the Division of Food and Drugs to cover the work required of the Department by legislation passed in 1934 relative to licensing places manufacturing frozen desserts, and also to the licensing of dealers in wood or methyl alcohol. Mr. Oscar Peterson was provisionally appointed to this position on October 31.

Dr. Leo Rane was appointed on July 2 as Senior Bacteriologist in the Antitoxin and Vaccine Laboratory of the Division of Biologic Laboratories, to fill the vacancy caused by the resignation on February 28 of Dr. Wilbur G. Malcolm.

VII. Organization

The organization of the Department is as follows:

Commissioner of Public Health	1
Public Health Council	6
Division of Administration:	
Secretary (1), Epidemiological Consultant (1), Clerks and Stenographers (11)	13
Division of Adult Hygiene:	
Herbert L. Lombard, M.D., Director.	
Epidemiologists (3), Social Workers (2), Public Health Education Workers (2), Clerks and Stenographers (15)	23

Division of Biologic Laboratories:
Elliott S. Robinson, M.D., Director.
Assistant Director (1), Chemists and Bacteriologists (8), Laboratory Assistants (3), Laboratory Helpers (9), Stable Foreman (1), Laborers (14), Janitors (2), Clerks and Stenographers (6)
(Wassermann Laboratory):
Chief of Laboratory (1), Bacteriologist (1), Laboratory Technician (1), Laboratory Assistant (1), Laboratory Helpers (5), Clerks and Stenographers (3) 57

Division of Communicable Diseases:
Gaylord W. Anderson, M.D., Director and Deputy Commissioner.
Assistant Director (1), District Health Officers (7), Epidemiologists (3), Clerks and Stenographers (8).
(Diagnostic Laboratory):
Bacteriologists (4), Laboratory Assistant (1), Laboratory Helper (1), Laborer (1), Clerks (2).
(Venereal Diseases):
Assistant Director (1), Epidemiologist (1), Public Health Social Hygiene Supervisor (1), Public Health Education Worker (1), Clerks and Stenographers (2) 35

Division of Food and Drugs:
Hermann C. Lythgoe, Director.
Chief of Laboratory (1), Chemists and Bacteriologist (5), Veterinary Food Inspectors (2), Food Inspectors (9), Laboratory Helpers (2), Laborer (1), Clerks and Stenographers (7) 28

Division of Child Hygiene:
M. Luise Diez, M.D., Director.
Child Welfare Physician (1), Epidemiologist (1), Public Health Dental Hygiene Supervisor (1), Public Health Nutrition Workers (4), Public Health Education Workers (2), Clerks and Stenographers (8).
(Maternal and Child Hygiene):
Child Welfare Physician (1), Public Health Nursing Supervisors (5), Clerks and Stenographers (6) 30

Division of Sanitary Engineering:
Arthur D. Weston, Chief Sanitary Engineer.
Engineers and Engineering Assistants (15), Clerks and Stenographers (12).
(Water and Sewage Laboratories):
Laboratory Coordinator (1), Chiefs of Laboratory (2), Chemists and Bacteriologist (10), Laboratory Assistant (1), Mechanical Handyman (1), Laborer (1), Watchman (1), Clerks and Stenographers (3) . . 48

Division of Tuberculosis:
Alton S. Pope, M.D., Director.
Assistant Director (1), Epidemiologist (1), Superintendent of Sanatoria Construction (1), Inspector of Settlements and Support Claims (1), Social Workers (2), Field Nurse (1), Clerks and Stenographers (9).
(Tuberculosis Clinics):
Supervisor of Tuberculosis Clinics (1), Child Welfare Physicians (3), Field Nurses (2), Public Health Nutrition Workers (2), X-ray Clinic Field Agents (2), Clerks and Stenographers (6) 33

Total 274

The average number of employees at each of the institutions under the supervision of the Department is as follows:

Lakeville State Sanatorium	180	
North Reading State Sanatorium	130	
Rutland State Sanatorium	203	
Westfield State Sanatorium	145	
Pondville Hospital	134	
		792
Grand Total for the Department		1,066

VIII. Publications

The following articles by members of the staff have been published:

Division of Administration

Tuberculosis as It Affects the General Hospital—
Henry D. Chadwick, M.D.
Bulletin of the American Hospital Association, April, 1934.
The Massachusetts Program for School Tuberculosis Control—
Henry D. Chadwick, M.D.
School Physicians' Bulletin, IV, 8, October, 1934.
Tuberculosis as It Affects the Physician's Practice—
Henry D. Chadwick, M.D.
New England Journal of Medicine, 211: 204–209, August 2, 1934.
The Health Forum—
Henry D. Chadwick, M.D. and Herbert L. Lombard, M.D.
New England Journal of Medicine, 211: 767–769, October 25, 1934.

Division of Adult Hygiene

Change in the Massachusetts Cancer Trend—
George H. Bigelow, M.D. and Herbert L. Lombard, M.D.
New England Journal of Medicine, 210: 526–529, March 8, 1934.
Chronic Rheumatism—
Herbert L. Lombard, M.D.
Public Health Nursing, May, 1934.

Division of Child Hygiene

Preparation for School—
Susan M. Coffin, M.D.
The Massachusetts Teacher, 13: 16, February, 1934.
The Charm School—
Albertine Parker McKellar.
Hygeia, 12, April, 1934.
Traveling Dental Service in Massachusetts—
Eleanor Gallinger McCarthy, D.H.
Journal of the American Dental Association, 21: 1104, June, 1934.
School Lunches in Massachusetts—
Mary Spalding and Angeline Hamblen.
Practical Home Economics, 12: 259, September, 1934.
Reprinted in Trained Nurse and Hospital Review, 93: 477, November, 1934.
Public Education—
Eleanor Gallinger McCarthy, D.H.
International Journal of Orthodontia and Dentistry for Children, 20: 913, September, 1934.
A Few Reminders for the Winter's Health Program—
Fredrika Moore, M.D.
The Massachusetts Teacher, 14: 32, October, 1934.

Division of Communicable Diseases

The Role of the Public Health Nurse in Communicable Disease Control—
Gaylord W. Anderson, M.D.
Public Health Nursing, 26: 66–75, February, 1934.
I Haven't Seen a Case in Thirty Years—
Nels A. Nelson, M.D.
Medical Economics, 12: 53–54, November, 1934.
The Neufeld Method of Pneumococcus Type Determination as Carried On in a Public Health Laboratory: A Study of 760 Typings—
Edith Beckler and Patricia MacLeod.
The Journal of Clinical Investigation, 13, November, 1934.
Epidemiological Value of Isolating Bacteriophage in Outbreaks of Intestinal Infection—
Roy F. Feemster, M.D., Dr. P. H.
American Journal of Public Health, 24: 1109–1115, November, 1934.

Division of Tuberculosis

Observations on Pulmonary Tuberculosis Among Members of the Same Families—
Paul Dufault, M.D.
American Review of Tuberculosis, 29, January, 1934.

Broncho-pulmonary Suppuration—
Ernest B. Emerson, M.D.
New England Journal of Medicine, 210: 365, February 15, 1934.

Sanatorium Treatment versus Home Treatment—
Paul Dufault, M.D.
Journal of the Outdoor Life, March, 1934.

Operative Surgery in Pulmonary Tuberculosis—
Frank H. Washburn, M.D.
New England Journal of Medicine, 210: 1006, May 10, 1934.

Bronchoscopy in the Sanatorium—
G. Arnold Rice, M.D.
New England Journal of Medicine, 210: 1008, May 10, 1934.

Bilateral Pneumothorax—
Gabriel Nadeau, M.D.
New England Journal of Medicine, 210: 1012, May 10, 1934.

Evolution of Pneumothorax Therapy—
Armand Laroche, M.D.
New England Journal of Medicine, 210: 1013, May 10, 1934.

Certain Aspects of Pulmonary Tuberculosis in Children with Special Reference to Prognosis—
Roy Morgan, M.D.
American Review of Tuberculosis, 29, May, 1934.

Cancer of the Mouth in Women—
Grantley W. Taylor, M.D.
New England Journal of Medicine, 210: 1102, May 24, 1934.

Bone Metastases from Carcinoma of the Urinary Bladder—
Roger Graves, M.D. and Raymond E. Militzer, M.D.
Journal of Urology, 31: 769, May, 1934.

Certain Factors Influencing the Mortality of Sanatorium Treated Cases of Pulmonary Tuberculosis—
Alexander D. Langmuir, A.B., Seiriol L. Williams, M.D. and Alton S. Pope, M.D.
New England Journal of Medicine, 211: 26, July 5, 1934.

A Further Report on the Cases Admitted to the Pondville Hospital during its First Two Years—
Staff of the Pondville Hospital.
American Journal of Cancer, 21: 648, July, 1934.

The Monocyte-Lymphocyte Ratio as a Measurement of Activity in Pulmonary Tuberculosis—
Gulli Lindh Muller, M.D.
New England Journal of Medicine, 211: 248, August 9, 1934.

Arsenical Keratoses and Carcinomas—
Clifford C. Franseen, M.D. and Grantley W. Taylor, M.D.
American Journal of Cancer, 22, October, 1934.

Report of a Case of Psoas Abscess Resulting from Tuberculosis of the Cervical Spine—
Louis Alpert, M.D.
New England Journal of Medicine, 211: 15, October 11, 1934.

The Carbohydrate Tolerance in Cancer Patients and the Effect of Roentgen Ray Radiation—
F. H. L. Taylor, Ph.D. and Henry Jackson, Jr., M.D.
American Journal of Cancer, 22, November, 1934.

The Treatment of Malignant Diseases of the Penis—
Roger C. Graves, M.D.
Journal of Urology, 32, November, 1934.

Mistaken Diagnoses of Cancer—
Dudley Merrill, M.D.
New England Journal of Medicine, 211: 801, November 1, 1934.

Division of Sanitary Engineering

Sanitation of Watersheds—
Arthur D. Weston.
Journal of the New England Water Works Association, 48, 3, September, 1934.

IX. LEGISLATION

The Department is submitting the following proposed legislation:

1. *Relative to Requiring Vaccination of Children in Private Schools*

The General Laws at present require smallpox vaccination of children as a prerequisite to public school attendance. While this has been effective in keeping the incidence of the disease at a figure lower than that of any other state in the Union, this protection to the community has come from the enforcement of this provision upon those who could not afford to go to a private school. This means, then, that those financially able to attend a private school can purchase their protection at the expense of those less favorably situated. The proposed amendment in extending the compulsory vaccination to include private schools would provide for equal participation on the part of all, thus avoiding any suggestion of what may well be called at present class legislation. In addition, it would prevent the occasional case of smallpox that occurs from time to time among children who have evaded or escaped vaccination through private school attendance.

2. *Relative to the Treatment of Gonorrhea and Syphilis and to Records of Cases of Gonorrhea and Syphilis*

The wisdom of the following modifications of existing statutes pertaining to gonorrhea or syphilis is self-evident. They aim:

(1) To remove any doubt as to local responsibility for furnishing treatment to infected indigents for the good of the individuals and the protection of the public;

(2) To remove any possible restraint from a physician who believes it advisable to give information necessary for self-protection to the husband or wife of an infected person under his care.

The words "gonorrhea or syphilis" are substituted for the words "venereal diseases" for the sake of conformity with the statutes. Gonorrhea and syphilis have been declared diseases dangerous to the public health but venereal diseases have not been defined either by the legislature or the State Department of Public Health.

X. FINANCIAL STATEMENT

Appropriations and Expenditures for the Year ended November 30, 1934

	Appropriations Plus Amounts Brought Forward	Expenditures to November 30
Division of Administration	$33,563.90	$32,991.21
Division of Adult Hygiene	74,774.27	74,433.99
Division of Child Hygiene	50,961.58	47,221.97
Maternal and Child Hygiene	32,198.54	29,898.60
Division of Communicable Diseases	81,752.83	78,123.76
Venereal Diseases	41,102.86	40,998.73
Division of Food and Drugs	60,970.98	59,681.37
Frozen Desserts	700.00	699.88
Administration of Shellfish Law	2,744.00	2,741.26
Division of Biologic Laboratories:		
Antitoxin and Vaccine	101,765.09	95,896.33
Wassermann Laboratory	20,919.45	20,641.47
Division of Sanitary Engineering	84,152.62	81,955.40
Water and Sewage Laboratories	46,565.26	45,225.96
Division of Tuberculosis	39,611.32	39,295.34
Subsidies to Cities and Towns	451,000.00	450,995.53
Tuberculosis Clinic Units	71,328.38	65,834.52
	$1,194,111.08	$1,166,635.32

Legislative Investigations for the Year ended November 30, 1934

	Appropriation	Expenditures to Nov. 30, '34
Investigation of Sanitary Condition of Lake Quinsigamond, Chap. 32, Res. 1934	$4,500.00	$4,330.52
South Essex Sewerage Investigation, Chap. 49, Res. 1934	3,000.00	2,978.09
	$7,500.00	$7,308.61

Receipts for Year ended November 30, 1934

Licenses, Etc.	$3,076.88

State Sanatoria and Pondville Hospital
Appropriations and Expenditures for the Year ended November 30, 1934

	Appropriations	Expenditures
Lakeville State Sanatorium	$268,138.94	$258,515.55
North Reading State Sanatorium	227,639.84	216,055.37
Rutland State Sanatorium	283,796.45	272,713.98
Westfield State Sanatorium	240,606.26	228,376.76
Pondville Hospital	237,602.56	230,445.63
Lakeville:		
Acts 1934, Chap. 162, Item 533, "Men's Lamp Rm and Equipment"	6,700.00	6,638.98
Acts 1934, Chap. 162, Item 534, "Women's Lamp Rm and Equipment"	6,700 00	6,665.18
Acts 1934, Chap. 162, Item 535, "X-Ray Machine and Flourescope"	4,000.00	58.35
Mass. State Project H-1 "Sewage Filters"	5,000.00	3,627.48
Rutland:		
Acts 1934, Chap. 162, Item 538 "Sewer Connections"	60,790.00	–
Acts 1934, Chap. 162, Item 539 "Sprinklers"	3,600.00	5.55
Mass. State Project H-3 "New Boilers at Power Plant"	37,000.00	21,140.55
Mass. State Project H-2 "Sewage Disposal"	7,500.00	6,471.12
Westfield:		
Mass. State Project H-4 "Sewage Filters"	8,000.00	6,767.57
Pondville:		
Acts 1934, Chap. 162, Item 542 "X-Ray Machine and Equipment"	5,000.00	4,953.57
Mass. State Project, H-6 "Addition to Hospital Building"	87,425.00	20,839.95
Mass. State Project, H-5 "Medical and Service Building"	197,400.00	44,148.63

Receipts

Lakeville State Sanatorium	$135,910.99
North Reading State Sanatorium	80,729.68
Rutland State Sanatorium	192,270.83
Westfield State Sanatorium	77,611.17
Pondville Hospital	100,175.55

Respectfully submitted,

HENRY D. CHADWICK, M.D.,
Commissioner of Public Health.

REPORT OF DIVISION OF ADULT HYGIENE

Herbert L. Lombard, M.D., *Director*

During the present year the Division of Adult Hygiene has devoted the greater part of the time to the cancer program and the remainder to other chronic diseases. In February, the Division moved from the Ford Building to the Public Works Building on Nashua Street. In the new building there is room for a small library, and all literature owned by the Division has been placed here. The many pamphlets and monographs are being catalogued.

The average monthly incoming mail amounted to 320 pieces and outgoing mail 1,530 pieces. Over 25,000 pieces of literature have been distributed. These included pamphlets on cancer, diabetes, rheumatism, heart disease, and other chronic diseases. Approximately thirty visitors per month came to the office for advice on various problems.

Three issues of The Commonhealth have been assembled by the Division—one on adult hygiene, one on diabetes, and the third on cancer. The latter two were prepared for general distribution to all physicians in the State as well as to the regular mailing list.

The Cancer Clinic Bulletin

This monthly bulletin which was primarily designed for the physicians working in the cancer clinics is now mailed to about one fourth of the physicians in the State. It contains abstracts of articles on cancer and items of interest regarding the clinic program. One issue was mailed to all physicians in the State, asking those who desired to receive the Bulletin regularly to notify us. The response of the physicians increased the issue by fourfold.

Health Forum

The Health Forum with combined newspaper and radio activities has been changed during the year. As a result of a study of the type of questions received, it was found that too many individuals were requesting definite medical advice rather than answers to public health questions. The Forum has ceased to answer such questions and in its stead various medical topics are discussed. Two such topics are discussed each week over the radio. Both of these articles are printed weekly in the Boston Globe and one is sent to seventy-four newspapers throughout the State.

Health Review

A new series of radio programs entitled "The Health Review" was started in January. In these broadcasts the various trends of public health history are discussed. The series began with early health measures common among the ancient Hebrews and has continued down through the Greek, Roman, and Medieval Ages to modern times. When completed, it will cover a comprehensive review of the history of public health.

Health Messages

The broadcasts sponsored by the Massachusetts Medical Society have continued throughout the year and a special broadcast on insulin was given on the anniversary of its discovery. During the year, 143 broadcasts have been given.

Lectures and Exhibits

Lectures have been given to various groups in the State and one before the Connecticut State Nurses' Association in Hartford. The average attendance at these lectures was seventy-five. Among the groups reached were several of the colleges which had a talk on cancer included in the biology course.

Exhibits were prepared for the annual meetings of the Massachusetts Medical Society, American College of Surgeons, American Public Health Association, and the State Nurses.

Tumor Diagnosis Service

The increase in specimens sent to the laboratory in 1933 was balanced by a decrease of 258 specimens this year, making a total of 2,528 specimens received in 1934. The Huntington Hospital showed a slight increase in the number of surgicals to 738. The smaller hospitals and individual surgeons outside the metropolitan area continued to send in the majority of the material. Quite a little material has been received from various State cancer clinics. This year 513 surgeons and 88 hospitals, a list of which is attached (Table XIX) utilized the service. A number of conferences with surgeons regarding specimens in which they were particularly interested have been held.

Owing to the marked interest in skin cancer, particularly in relation to its radio sensitivity, the study of epidermoid carcinoma concluded last year has been extended to consider in detail the pathology of the basal cell carcinoma.

Dr. Arthur M. Cloudman resigned as resident September 1, 1934, to join the research staff of the Jackson Laboratory at Bar Harbor. Dr. Olive Gates, formerly assistant pathologist at the New England Deaconess Hospital, was appointed assistant pathologist in this laboratory. Dr. John Fallon, Littauer Fellow in Pathology, made a detailed study of precancerous lesions of the breast during his appointment. His place was taken September 1 by Dr. J. R. E. Morgan, Instructor in Pathology at the University of Toronto. Dr. Morgan is working particularly on functioning tumors of endocrine glands. Dr. Wyatt C. Simpson served as interne from January until March 1, and Dr. Richard Peterson served as interne from July 1 to December 31.

Social Service

Social service has been continued in the clinics as in former years. In June a meeting of the cancer clinic social workers was held at Pondville Hospital.

Assistance

Statistical assistance has been given to a number of physicians both in and out of Massachusetts. There has also been interdepartmental statistical assistance rendered. The Massachusetts Federation of Women's Clubs was assisted in securing speakers for several of its meetings.

Pondville Code

A large amount of work has been devoted to perfecting a punch-card code for the Pondville Hospital cancer patients. This has been attempted in previous years but could not be accomplished because of lack of space on the card. With the new eighty-line card it has been possible to prepare a code satisfactory to the surgeons at Pondville.

Education Committees

The education committees of the cancer committees were contacted at frequent intervals throughout the year and a general meeting for all of them was held at Pondville on November 7. During the greater part of the year these committees were furnished with material on cancer for newspaper publicity. This was discontinued in October with the advent of the new type of publicity. The experience in the cancer clinics has indicated that the publicity methods used have not accomplished the desired results and, as a result, the program has been changed to lessen activity through the newspapers and to effect a more concerted drive for education of the laity through the medical profession.

Studies

Cancer and Tuberculosis: The death records are being collected as a continuation of the study started last year.

Rockefeller Study: Work on this study has been progressing. This includes investigation into the etiology of cancer and the evaluation of the cancer mortality records.

Weight and Morbidity: The chronic disease survey cards were studied in more detail to determine what relation existed between weight and morbidity. The analysis is progressing.

Changing Vital Statistics: An analysis of the changes in the Massachusetts vital statistics between 1850 and 1930 is being made.

Cancer Clinic Social Service Follow-Up: A study of the cancer patients from admission to death is being continued.

Cancer in Boston: The records of the tumor clinic of the Massachusetts General Hospital were studied and a paper prepared on this subject.

Diabetes: An intensive study of diabetes was made and a paper prepared.

STATE-AIDED CANCER CLINICS

A study of the cancer clinics indicates that the bulk of cancer patients are being referred to the clinics by physicians. There has been a steady increase in this trend since the inception of the program. Plans are under way for strengthening the individual clinics so that the medical profession will use them more in the future than it has in the past. A meeting of the cancer clinic chiefs was held on October 31 and at this meeting proposed changes in clinic management were discussed. In April the Massachusetts Medical Society Cancer Committee held a teaching clinic at the Massachusetts General Hospital for physicians working in the cancer clinics.

During the year the clinics were graded by a score card prepared for this purpose. This has greatly helped in pointing out the weak aspects of individual clinics.

In November the Franklin County Medical Society voted to reopen the Franklin County Clinic.

The Fitchburg Clinic held a special session on November 14 to which all the physicians in the district were invited. The Lawrence Clinic has conducted a similar undertaking several times during the year.

The American College of Surgeons has approved the state-aided cancer clinics in seven hospitals:

Pondville Hospital, Norfolk
City Hospital, Worcester
Memorial Hospital, Worcester
Boston Dispensary
Lawrence General Hospital
Lowell General Hospital
Lynn Hospital

Table I. The attendance at the state-aided cancer clinics in 1934 was 4,255—an increase of 8.5 per cent over the preceding year. More females attended the clinics than males. Cancer cases comprised 23.3 per cent of the total admissions. Nine hundred and ninety-two individuals with cancer were seen. These individuals had 1,041 cancers and appeared 1,058 times at different clinics. There is very little change in the percentage of individuals having cancer throughout the years in which the cancer clinics have been in operation. The highest rate in any year was 25.4 in 1930 and the lowest rate 21.0 in 1928. The percentage of individuals with precancerous lesions has increased from 11.6 in 1933 to 13.8 in 1934. This is gratifying, as the removal of precancerous lesions is probably the best attack upon the disease at the present time. This year showed the highest percentage of precancerous lesions of any of the years. Only about 4 per cent of the individuals who came to the clinics had no pathology. This figure is about the same as that for previous years. The median age of both the cancer patients and the total clinic attendance has remained practically constant throughout the eight years of clinic operation.

Table II. The number of cities and towns from which individuals came to the cancer clinics increased slightly in 1934 over 1933.

Table III. In 1934 the Pondville clinic had about three times as many patients as the next largest clinic and comprised about one third of the total clinic attendance. Brockton, Lowell, Lynn, New Bedford, and Springfield had over 300 patients each; the Boston Dispensary and Worcester over 200; and Lawrence and Worcester North over 100. Newton and the Berkshire clinics had less than 100 cases. The percentage of cancers varied considerably in the different clinics. Berkshire, Brockton, Lowell, New Bedford, Springfield, and Worcester North had rates of less than 20 per cent; while Newton, Lawrence, and Pondville had rates of over 30 per cent. The percentage of individuals with cancer has decreased in all clinics save Newton, Lynn, and Pondville. On the other hand, the percentage of individuals with precancerous lesions has increased in all clinics save New Bedford, Worcester, and Newton. The highest percentages of precancerous lesions were found in the Boston Dispensary, Pondville, and Lynn clinics.

Table IV. The percentage of cancer subdivided by whether or not the patients were referred by a physician is shown in this table. In every clinic with the exception of Newton, in which the number of cases is too small to be significant, the cancer rate among those referred by physicians greatly exceeded the rate among those not referred.

Table V. The median duration before the first visit by the patient to a physician showed little change between the years 1933 and 1934. A similar situation exists for duration before first visit to a cancer clinic. Evidently, further efforts are needed to reduce the period of delay.

Table VI. The duration before coming to a clinic subdivided by contact with physician showed little change between this year and the preceding one with the exception of the group that consulted no physician. Here there has been an increase. The group that came earliest to the clinics is that which consulted one physician and was referred by him to the clinic. Even in this group the interval is too long.

Table VII. The percentage of cancer patients who came to the clinics referred by physicians has continued to increase, while the percentage referred by newspapers has decreased. In 1927 physicians referred 47.3 per cent of the cancer patients, while in 1934 this figure had increased to 70.5. About half of the individuals with precancerous lesions were referred by physicians and one fifth by newspapers.

Table VIII. The percentage of individuals who came to the clinics at the advice of physicians has remained about the same in 1934 as in 1933, while the percentage who came because of newspaper publicity has increased. Inasmuch as the cancer cases referred by physicians showed an increase and those referred by newspapers a decrease, the indication is clear that the newspapers are increasing the attendance of individuals not having cancer.

Table IX. Cancer patients who came to the clinics referred by physicians comprised 70.5 per cent of all cancer cases in 1934, compared with 68.3 in 1933 and 64.0 in 1932. The newspapers were responsible for only 9.3 per cent of the cancer cases in 1934.

Table X. The distribution of cancers coming to the clinics in 1934 showed a decrease in cancer of the buccal cavity and uterus and an increase in cancer of the breast and skin. Inasmuch as cancer of the uterus and cancer of the breast have nearly the same number of deaths, it seems unfortunate that the number of individuals with cancer of the uterus coming to the clinics has declined.

Table XI. The diagnoses of previous years were changed in 1934 in 211 cases, and 95 diagnoses made in previous years which inadvertently had been omitted were recorded.

Table XII. The contact of the patients with physicians is shown in this table. Of the total cancer patients coming to the clinics, 11.6 per cent had never consulted a physician, 14.1 per cent had consulted one or more physicians but had come of their own volition, 38.4 per cent had consulted one physician and were referred by him, and 30.6 per cent had consulted more than one physician and had been referred by the last one consulted. These figures differed little from those of the preceding year.

Table XIII. The distribution of the cancer cases in the group that came directly to the clinics without consulting a physician differed radically from the other three groups. This group showed a larger percentage of skin and breast cancers, and a much smaller percentage of all other types. Apparently educational activities are not being felt as well in cancer of the uterus as in cancer of the mouth, breast, and skin.

Table XIV. The percentage of individuals who had never seen a physician prior to their clinic visit was less in 1934 than in 1933, which in turn was less than in 1932. There appears to be a steady increase in the percentage of cases coming to the clinics who have seen physicians.

Table XV. The symptoms that first brought patients to the clinics closely resembled those of previous years. It is disappointing to note that so large a percentage of the cancer patients come because of pain. For the last three years the percentage of individuals with cancer who came with pain as a symptom has remained practically constant.

Table XVI. Both males and females showed an increase in operable cancer with a chance for probable cure. This indicates that patients are arriving at the clinics at an earlier period in the disease. Buccal cavity and skin were the two types that showed the greatest improvement. The breast cases showed a decrease, which is discouraging. While there was a slight improvement in the percentage of operable cancer with probable cure for cancer of the uterus over the preceding year, the fact that only 7 per cent of individuals with cancer of the uterus comes sufficiently early to be classified as probable cure is most discouraging.

Table XVII. Nearly half the males were classified as operable cancer with probable cure and slightly over one third of the females. There was considerable variation between the various clinics. This great discrepancy is probably due largely to different interpretations in the clinics, as it does not seem reasonable to believe that such great differences actually occurred as appear in this table.

Table XVIII. The diagnoses of various conditions found in the clinics are shown in this table. As some individuals had more than one condition, there were more diagnoses given than the total number of patients. Cancers comprised the largest percentage with benign tumors second, and precancerous lesions third. Of the nonmalignant conditions, diseases of the digestive system were the most common.

TABLE I. — *Attendance at State-Aided Cancer Clinics, 1934*

Total individuals attending clinics	4,255.
Total individuals having cancer	992.
Total individuals having precancerous lesions	586.
Total individuals having post-operative cancer, no evidence of recurrence	105.
Total attendance at clinics	4,443.
Total cancer attendance at clinics	1,058.
Total precancer attendance at clinics	607.
Total post-operative cancer, no evidence of recurrence, attendance at clinics	121.
Total diagnoses	4,435.
Total cancer diagnoses	1,041.
Total precancer diagnoses	638.
Total post-operative cancer, no evidence of recurrence, diagnoses	112.
Percentage of individuals with cancer	23.3.
Percentage of individuals with precancerous lesions	13.8.
Median age of total clinic patients	50.3.
Median age of cancer patients	62.4.

TABLE II. — *Residents of Massachusetts Cities and Towns Attending State-Aided Cancer Clinics*

	1933	1934
Number of places with 1 patient	63	56
Number of places with 2–5 patients	70	79
Number of places with 6–9 patients	38	35
Number of places with 10 patients and over	74	78
Total number of places	245	248

TABLE III. — *Attendance at State-Aided Cancer Clinics, by Individual Clinic*

CLINIC	1934 Admissions*			Percentage Precancer		Percentage Cancer	
	MALES	FEMALES	TOTAL	1933	1934	1933	1934
Berkshire	20	47	67	5.3	11.9	13.2	7.5
Boston Dispensary	100	154	254	17.1	18.1	30.4	26.4
Brockton	103	267	370	9.1	13.5	19.9	15.9
Lawrence	44	83	127	8.0	11.0	38.4	34.6
Lowell	123	197	320	11.6	12.2	16.6	16.2
Lynn	139	273	412	7.7	15.1	19.8	20.4
New Bedford	191	361	552	7.7	7.1	15.3	12.3
Newton	1	4	5	20.0	0.0	0.0	80.0
Pondville	633	871	1,504	18.0	18.1	33.8	35.8
Springfield	116	224	340	6.4	10.6	20.7	13.2
Worcester	100	194	294	7.1	4.4	25.1	24.1
Worcester North	61	137	198	11.9	14.1	18.7	10.1

*Some individuals went to more than one clinic.

TABLE IV. — *Cancer Rate Subdivided by Whether or Not Patients Were Referred by Physician, by Individual Clinic*

Rate per 100

CLINIC	1934		
	REFERRED BY PHYSICIAN	NOT REFERRED BY PHYSICIAN	TOTAL
Berkshire	27.3	3.6	7.5
Boston Dispensary	28.4	20.3	26.4
Brockton	30.1	11.2	15.9
Lawrence	50.0	14.5	34.6
Lowell	32.5	11.1	16.2
Lynn	33.9	15.5	20.4
New Bedford	28.8	5.4	12.3
Newton	75.0	100.0	80.0
Pondville	39.9	23.5	35.8
Springfield	24.0	8.8	13.2
Worcester	37.5	17.7	24.1
Worcester North	19.4	5.3	10.1

TABLE V. — *Median Duration in Months Between First Symptom and First Visit to Physician and First Visit to Clinic, by Location of Cancer*

LOCATION OF CANCER	Median Duration Before First Visit to Physician		Median Duration Before First Visit to Clinic	
	1933	1934	1933	1934
Buccal Cavity	6.0	5.0	7.1	7.4
Digestive Tract	4.1	4.0	6.9	6.1
Respiratory System	4.0*	2.7*	8.5*	7.0
Uterus	4.3	3.3	6.9	6.8
Other Female Genital Organs	5.5*	6.3*	6.8*	7.5*
Breast	3.4	5.6	6.0	6.6
Male Genito-Urinary Organs	6.1*	4.0*	8.8	12.5*
Skin	12.5	12.4	18.5	12.8
Other and Unspecified Organs	4.8	3.5	9.0	7.0
Total	6.2	6.3	9.4	9.2

*Based on less than 25 cases.

Table VI. — *Median Duration in Months of Cancer Symptoms before First Visit to Clinic, by Contact with Physician and by Location of Cancer*

Location of Cancer	1934			
	Referred by Physician		Not Referred by Physician	
	One Physician Consulted	More Than One Physician Consulted	One or More Physicians Consulted	No Physicians Consulted
Buccal Cavity	5.0	10.0	11.0	8.8
Digestive Tract	4.5	6.6	*	*
Respiratory System	*	7.3	*	*
Uterus	4.8	12.6	6.8	*
Other Female Genital Organs	*	10.0	*	*
Breast	5.3	12.4	12.3	5.5
Male Genito-Urinary Organs	*	10.0	*	*
Skin	12.8	24.1	12.8	12.8
Other and Unspecified Organs	6.4	13.0	9.0	*
Total	7.0	12.0	12.2	10.5
Total 1933	6.9	12.0	12.6	8.0

*Median not well established.

Table VII. — *Reason for Coming to Clinic, by Diagnosis*

Rate per 100*

Reason	Cancer		Precancerous Lesions		All Others		Total	
	1933	1934	1933	1934	1933	1934	1933	1934
Physician	68.3	70.5	52.9	46.1	38.3	38.6	47.4	47.1
Friends or Relatives	8.6	6.1	8.4	9.7	16.5	10.7	13.6	9.5
Newspapers	10.4	9.3	19.2	20.6	29.5	35.3	23.6	27.0
All Others	22.3	24.7	26.0	33.8	20.0	20.6	21.3	23.4

*Does not total to 100 per cent, as some individuals gave more than one reason.

Table VIII. — *Reason for Coming to Clinic, by Individual Clinic, for Total Admissions*

Rate per 100*

Clinic	Physician		Friends or Relatives		Newspapers		All Others	
	1933	1934	1933	1934	1933	1934	1933	1934
Berkshire	15.8	16.4	10.5	1.5	57.9	80.6	15.8	1.5
Boston Dispensary	60.5	75.1	17.5	10.1	1.4	3.5	20.6	12.5
Brockton	20.5	25.1	14.7	12.9	58.7	56.0	7.5	12.9
Lawrence	43.2	56.7	17.6	14.2	28.8	15.7	11.2	14.2
Lowell	25.6	24.0	24.8	24.6	41.2	39.6	10.0	15.9
Lynn	28.6	26.7	7.9	16.3	41.0	37.3	24.1	20.6
New Bedford	38.4	29.5	12.6	9.2	38.1	52.3	11.5	9.4
Newton	40.0	80.0	20.0	0.0	20.0	0.0	20.0	20.0
Pondville	72.9	75.0	10.1	3.6	0.3	0.0	33.2**	39.3**
Springfield	25.5	29.8	29.3	12.6	30.3	45.6	14.9	12.0
Worcester	35.2	33.0	3.0	5.7	35.9	27.6	27.7	33.7
Worcester North	34.3	33.8	14.2	7.6	32.8	49.0	18.7	9.6
Total	47.4	47.1	13.6	9.5	23.6	27.0	21.3	23.4

*Does not total to 100 per cent, as some individuals gave more than one reason.
**This increase is due to the large number of former patients returning to the clinic for new conditions

TABLE IX. — *Reason for Coming to Clinic, by Location of Cancer*

Rate per 100*

LOCATION OF CANCER	Physician		Social Worker		Nurse		Friends or Relatives		Clergy, Radio, Pamphlets		News-papers		Lectures		Past Experience or Former Patient		Dentist		Others	
	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934
Buccal Cavity	64.9	66.0	4.6	5.3	1.2	1.3	9.2	8.7	0.0	0.7	12.7	12.7	0.0	0.0	15.5	12.7	0.6	2.0	2.3	2.7
Digestive Tract	75.2	83.6	3.8	3.8	1.9	1.9	6.7	3.8	0.0	1.0	6.7	3.8	0.0	0.0	11.4	9.6	0.0	0.0	2.9	0.0
Respiratory System	88.2	79.3	5.9	3.4	0.0	3.4	0.0	3.4	0.0	0.0	0.0	10.4	0.0	0.0	17.7	17.3	0.0	0.0	0.0	3.4
Uterus	85.6	82.8	2.4	7.6	0.8	1.9	3.2	1.9	0.0	0.0	3.2	4.8	0.0	0.0	23.2	15.2	0.0	0.0	2.4	0.0
Other Female Genital Organs	87.5	100.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	6.3	0.0	0.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0
Breast	61.9	70.3	3.2	3.1	4.0	1.9	13.5	8.6	0.8	0.0	13.5	11.1	0.0	0.0	7.1	15.4	0.0	0.0	0.0	1.2
Male Genito-Urinary Organs	79.4	94.0	2.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5	18.2	0.0	0.0	0.0	3.0
Skin	57.0	60.8	4.2	8.4	3.3	2.9	10.7	6.5	0.3	0.3	15.6	11.7	0.0	0.3	11.7	14.6	0.0	0.0	2.3	2.1
Other and Unspecified Organs	84.8	78.6	1.7	4.8	1.7	0.0	6.8	9.5	0.0	0.0	3.4	2.4	0.0	0.0	13.6	7.1	0.0	0.0	0.0	4.8
Hodgkin's Disease and Leukemia	84.2	71.4	5.3	4.8	0.0	0.0	10.5	0.0	0.0	0.0	0.0	9.5	0.0	0.0	15.8	19.0	0.0	0.0	0.0	9.5
Total	68.3	70.5	3.7	6.0	2.2	2.0	8.6	6.1	0.2	0.3	10.4	9.3	0.0	0.1	14.4	14.1	0.1	0.3	1.7	1.9

*Does not total to 100 per cent, as some individuals gave more than one reason.

TABLE X. — *Location of Cancer*

Rate per 100

LOCATION OF CANCER	1933	1934
Buccal Cavity	18.0	14.7
Digestive Tract	10.9	10.2
Respiratory System	1.8	2.8
Uterus	13.0	10.3
Other Female Genital Organs	1.7	1.2
Breast	13.1	15.9
Male Genito-Urinary Organs	3.5	3.2
Skin	32.0	37.6
Other and Unspecified Organs	6.1	4.1

TABLE XI. — *Correction in 1934 of Previous Years*

	Changed to Cancer	Changed from Cancer	Pondville Clinic Cases of Previous Years Recorded in 1934	Other Clinic Cases of Previous Years Recorded in 1934
Buccal Cavity	13	24	–	–
Digestive Tract	13	9	–	1
Respiratory System	1	1	–	–
Uterus	15	8	–	–
Other Female Genital Organs	8	5	–	–
Breast	15	11	–	1
Male Genito-Urinary Organs	6	–	–	–
Skin	53	9	7	1
Other and Unspecified Organs	9	8	–	–
Hodgkin's Disease and Leukemia	2	1	–	–
Precancerous Lesions	–	–	79	–
Benign Tumors	–	–	4	–
Diseases of the Genito-Urinary System	–	–	1	–
Gastric Ulcer	–	–	1	–
Total	135	76	92	3

TABLE XII. — *Contact of Cancer Patients with Physician*

Rate per 100

	1933	1934
Referred by physician:		
One physician consulted	38.6	38.4
More than one physician consulted	28.6	30.6
Unknown	1.4	1.5
Not referred by physician:		
One or more physicians consulted	15.9	14.1
No physicians consulted	14.7	11.6
Unknown	0.8	3.8

TABLE XIII. — *Reason for Coming to Clinic, by Location of Cancer and Contact with Physician*

Rate per 100

LOCATION OF CANCER	1934					
	REFERRED BY PHYSICIAN			NOT REFERRED BY PHYSICIAN		
	One Physician Consulted	More Than One Physician Consulted	Total	One or More Physicians Consulted	No Physicians Consulted	Total
Buccal Cavity	14.2	13.3	13.8	20.4	16.5	16.9
Digestive Tract	9.1	16.5	12.1	9.2	3.3	5.7
Respiratory System	0.5	6.8	3.2	2.1	1.7	2.0
Uterus	13.5	10.7	12.1	9.9	1.7	6.0
Other Female Genital Organs	1.0	2.6	1.7	0.0	0.0	0.0
Breast	16.3	15.5	15.8	13.4	23.1	15.9
Male Genito-Urinary Organs	3.3	5.8	4.3	1.4	0.0	0.7
Skin	38.3	23.3	32.4	38.0	52.9	49.8
Other and Unspecified Organs	3.8	5.5	4.6	5.6	0.8	3.0

TABLE XIV. — *Contact of Cancer Patients with Physician, by Location of Cancer*

Rate per 100

LOCATION OF CANCER	NO PHYSICIAN		ONE PHYSICIAN		TWO OR MORE PHYSICIANS	
	1933	1934	1933	1934	1933	1934
Buccal Cavity	19.3	13.7	47.9	47.9	32.8	38.4
Digestive Tract	2.9	3.8	51.4	40.4	45.7	55.8
Respiratory System	6.3	7.1	37.5	10.7	56.2	82.2
Uterus	3.2	2.0	46.4	54.9	50.4	43.1
Other Female Genital Organs	12.5	0.0	43.7	33.3	43.7	66.7
Breast	22.4	17.6	54.4	46.5	23.2	35.9
Male Genito-Urinary Organs	3.0	0.0	30.3	39.4	66.7	60.6
Skin	23.9	18.8	55.3	54.5	20.8	26.7
Other and Unspecified Organs	3.5	2.4	38.6	46.3	57.9	51.3
Hodgkin's Disease and Leukemia	0.0	0.0	36.8	40.0	63.2	60.0
Total	15.1	12.3	49.5	48.1	35.4	39.6

TABLE XV. — *Symptoms that First Brought Patient to Clinic, by Diagnosis*

Rate per 100*

SYMPTOMS	1934		
	Cancer	Precancerous Lesions	Total
Swelling	35.9	25.1	36.2
Ulceration	38.7	21.0	17.8
Discharge and Bleeding	19.8	16.1	18.9
Pain	28.7	22.2	36.5
Deformity	8.7	35.4	13.2
Loss of Weight	12.3	5.8	10.7
Malaise	2.5	2.4	5.5
Observation	2.7	0.9	2.6
Itching	3.2	4.2	3.3
Scaly Skin	1.5	2.8	1.3
Others	11.3	5.0	9.5
Unknown	0.2	0.6	0.4

*Does not total to 100 per cent, as multiple symptoms were given by some patients.

TABLE XVI. — *Type of Cancer, by Location of Cancer and Sex*

Rate per 100

LOCATION OF CANCER	Operable Cancer Probable Cure		Operable Cancer Possible Cure		Operable Cancer Palliative Measures Only		Inoperable Cancer	
	1933	1934	1933	1934	1933	1934	1933	1934
MALES								
Buccal Cavity	33.5	40.7	35.5	29.6	21.3	17.8	9.7	11.9
Digestive Tract	1.4	3.0	25.7	31.3	31.1	31.3	41.8	34.4
Respiratory System	0.0	0.0	23.1	13.0	69.2	43.5	7.7	43.5
Breast	0.0	25.0	100.0	50.0	0.0	25.0	0.0	0.0
Male Genito-Urinary Organs	18.8	9.7	18.8	22.6	31.2	41.9	31.2	25.8
Skin	72.8	82.2	25.7	14.7	1.0	2.2	0.5	0.9
Other and Unspecified Organs	19.1	10.0	14.3	25.0	47.6	10.0	19.1	55.0
Total	41.3	49.1	27.7	22.0	18.0	15.0	13.0	13.9
FEMALES								
Buccal Cavity	50.0	54.5	35.7	27.3	7.1	9.1	7.1	9.1
Digestive Tract	7.1	8.8	21.4	44.1	25.0	20.6	46.4	26.5
Respiratory System	0.0	25.0	0.0	0.0	50.0	0.0	50.0	75.0
Uterus	6.6	7.0	36.4	42.0	34.7	26.0	22.3	25.0
Other Female Genital Organs	15.4	16.7	30.8	25.0	23.1	25.0	30.8	33.3
Breast	23.1	19.5	49.6	41.6	12.4	18.8	14.9	20.1
Skin	76.8	85.6	14.3	13.0	6.3	0.7	2.7	0.7
Other and Unspecified Organs	25.0	10.0	16.7	30.0	25.0	20.0	33.3	40.0
Total	32.0	37.4	32.0	31.3	18.9	14.5	17.2	16.8

TABLE XVII. — *Type of Cancer, by Individual Clinic and by Sex*

Rate per 100

CLINIC	1934							
	MALES				FEMALES			
	Operable Cancer Probable Cure	Operable Cancer Possible Cure	Operable Cancer Palliative Measures Only	In-operable Cancer	Operable Cancer Probable Cure	Operable Cancer Possible Cure	Operable Cancer Palliative Measures Only	In-operable Cancer
Berkshire	66.7	0.0	0.0	33.3	0.0	0.0	50.0	50.0
Boston Dispensary	52.9	14.7	5.9	26.5	45.2	25.8	3.2	25.8
Brockton	70.4	11.1	3.7	14.8	36.7	40.0	10.0	13.3
Lawrence	41.7	37.5	8.3	12.5	45.0	30.0	15.0	10.0
Lowell	66.7	16.7	13.3	3.3	33.3	33.3	22.2	11.1
Lynn	60.0	17.8	20.0	2.2	51.3	25.6	23.1	0.0
New Bedford	33.3	29.6	14.8	22.2	32.4	43.3	8.1	16.2
Newton	0.0	0.0	0.0	0.0	66.7	0.0	0.0	33.3
Pondville	44.7	20.8	16.5	18.0	32.9	30.3	16.5	20.3
Springfield	65.0	10.0	20.0	5.0	40.9	36.4	9.1	13.6
Worcester	35.2	37.8	24.3	2.7	33.3	41.7	16.7	8.3
Worcester North	57.2	42.8	0.0	0.0	20.0	50.0	10.0	20.0
Total	48.7	21.6	15.2	14.5	36.0	32.4	14.9	16.7

TABLE XVIII. — *Diagnosis**

Rate per 100

DIAGNOSIS	1933	1934
Cancer primary	16.0	16.1
Cancer with metastases	4.6	4.7
Cancer recurrent following operation	2.8	2.3
Original diagnosis non-cancer, changed to cancer	0.6	0.4
Cancer recurrent, formerly post-operative cancer	0.1	0.07
Precancerous lesions changed to cancer	0.5	0.3
Diagnosed cancer at death	0.1	0.07
Original diagnosis no recurrence, diagnosed recurrent cancer of same site at death	0.1	0.0
Original diagnosis non-cancer, diagnosed cancer of same site at death	0.03	0.05
Hodgkin's disease, changed to cancer	0.0	0.02
Original diagnosis non-cancer, changed to Hodgkin's disease	0.0	0.02
Hodgkin's disease and leukemia	0.5	0.5
Post-operative cancer, no evidence of recurrence	2.8	2.6
Benign tumors	16.5	16.7
Precancerous lesions	12.8	15.0
Original diagnosis cancer, changed to non-cancer	1.1	0.7
Original diagnosis cancer recurrent, changed to post-operative cancer	0.03	0.0
Original diagnosis Hodgkin's disease, changed to non-cancer	0.1	0.0
Diseases of the digestive system	9.2	9.1
Diseases of the circulatory system	1.8	1.2
Diseases of the genito-urinary system	6.4	6.9
Diseases of the respiratory system	0.5	0.7
Diseases of the nervous system	1.0	1.4
Diseases of the skin	5.5	5.8
Mouth lesions	1.7	2.4
Diseases of the bone	0.7	0.6
Diseases of the eye and ear	0.3	0.4
Tuberculosis	0.5	0.4
Diabetes	0.03	0.2
Pernicious anemia	0.2	0.1
Rheumatism	0.7	0.2
Goitre	0.2	0.3
Syphilis	0.4	0.4
Apoplexy	0.03	0.0
Endocrine dysfunction	0.0	0.05
Undiagnosed	0.7	0.3
Deferred	2.9	4.3
No pathology	4.4	4.1
Non-cancer, diagnosis not established	0.4	1.1
All others	6.3	5.2

*Does not total to 100 per cent, as some individuals had more than one diagnosis.

TABLE XIX.—*Tumor Diagnosis Service, 1934*

Specimens were received from hospitals listed below:

Acushnet Sanitarium and Hospital, New Bedford
Audubon Hospital, Boston
Ayer Memorial Hospital, Ayer

Table IX—*Continued.*

Baker Clinic, Boston
Barr Sanitarium, Lawrence
Bay State Hospital, Boston
Benson Hospital, Haverhill
Board of Health Hospital, Salem
Bridgewater State Hospital, State Farm
Brockton Hospital, Brockton
Burbank Hospital, Fitchburg

Cable Hospital, Ipswich
Cambridge Relief Hospital, Cambridge
Cape Cod Hospital, Hyannis
Central Hospital, Somerville
Chester Hospital, Cambridge
Chicopee Hospital, Aldenville
Clinton Hospital, Clinton
Clover Hill Hospital, Lawrence
Commonwealth Avenue Hospital, Boston

Danvers State Hospital, Danvers
Dover Street Clinic, Boston
Ducy Hospital, Brockton

East Cambridge Emergency Hospital, Cambridge
Eaton Hospital, Brockton
Elmhurst Hospital, Holbrook
Evangeline Booth Hospital, Boston

Fairlawn Hospital, Worcester
Fairview Hospital, Great Barrington
Forest Hills Hospital, Jamaica Plain

Gale Hospital, Haverhill
Gardner State Colony, Gardner
Glynn Hospital, Dorchester

Harley Hospital, Boston
Haverhill Municipal Hospital, Haverhill
Henry Heywood Memorial Hospital, Gardner
Hillcrest Hospital, Pittsfield
Hingham Private Hospital, Hingham
Holyoke Hospital, Holyoke
House of Mercy, Pittsfield

Jordan Hospital, Plymouth

Lakeville State Sanatorium, Lakeville
Lawrence City Hospital, Lawrence
Lawrence General Hospital, Lawrence
Leominster Hospital, Leominster
Louis Pasteur Hospital, Worcester
Lowell General Hospital, Lowell
Ludlow Hospital, Ludlow
Lynn Hospital, Lynn

MacLeod Hospital, Boston
Mary A. Alley Hospital, Marblehead
Mary Lane Hospital, Ware

Table XIX. *Tumor Diagnosis Service, 1934—Continued.*

Massachusetts Hospital School, Canton
Massachusetts Osteopathic Hospital, Jamaica Plain
Memorial Clinic, Inc., Holyoke
Middlesex Hospital, Cambridge
Milford Hospital, Milford
Millers River Hospital, Winchendon
Milton Hospital, Milton
Moore Hospital, Brockton
Morton Hospital, Taunton
Murdock Hospital, Brockton

Nantucket Cottage Hospital, Nantucket
New England Sanitarium, Melrose
Noble Hospital, Westfield
Norfolk County Hospital, Norfolk
Norfolk Medical Center, Stoughton
Norfolk Prison Colony, Norfolk
Norwood Hospital, Norwood

Providence Hospital, Holyoke

Riverbank Hospital, Boston

St. John's Hospital, Lowell
St. Joseph's Hospital, Lowell
St. Luke's Hospital, Middleboro
Somerville Hospital, Somerville
Springfield Infirmary, Springfield
Springfield Hospital, Springfield
Sturdy Memorial Hospital, Attleboro
Sullivan Memorial Hospital, Worcester
Sunnyside Hospital, Somerville

Trumbull Hospital, Brookline

Union Hospital, Lynn
Union Hospital, New Bedford
United States Naval Hospital, Chelsea

Wesson Memorial Hospital, Springfield
Winchester Hospital, Winchester
Wing Memorial Hospital, Palmer
Worcester Memorial Hospital, Worcester

REPORT OF DIVISION OF BIOLOGIC LABORATORIES

Elliott S. Robinson, M.D., Ph.D., *Director*
Roy F. Feemster, M.D., *Assistant Director*

The annual report of this Division is respectfully submitted. The figures for distribution of products and in the case of the Wassermann Laboratory for number of tests are figures for the calendar years.

I. Antitoxin and Vaccine Laboratory

1. Distribution of Products

	1930	**1931**	**1932**	**1933**	**1934**
Diphtheria Antitoxin, 1,000 unit doses	264,378	212,601	195,648	164,587	141,238
Antimeningococcic Serum, 15 cc. doses	5,433	3,577	3,530	2,960	2,959
“ “ Conc. 15 cc. doses	158	115	–	–	–
“ “ Bulk cc.	7,200	–	–	–	–
Antipneumococcic Serum, Conc. 15 cc. doses	1,253	1,392	2,591	2,849	2,382
“ “ 100 cc. doses	1	–	–	–	–
“ “ Lederle	–	–	18	108	–
Scarlet Fever Streptococcus Antitoxin, doses	4,841	3,433	–	2,207	2,568
Anti-Measles-Diplococcus Serum—vials	3	447	–	–	–
Influenza Serum, vials	245	481	573	757	913
“ “ (Bulk) cc.	–	–	–	–	200
Typhus Serum, 20 cc. vials	–	–	40	20	667
“ “ (Bulk) cc.	–	–	–	100	100
Normal Horse Serum, cc.	175,970	51,375	31,395	20,865	19,960
Calf Serum, vials	–	–	–	–	40
Human Serum—Poliomyelitis Convalescent, vials	–	–	714	951	502
“ “ —Scarlet Fever Convalescent, vials	–	–	–	231	605
“ “ —Normal Adult, vials	–	–	–	22	45
Placental Extract, vials	–	–	–	–	36
Smallpox Vaccine Virus, capillary tubes	325,427	290,824	350,727	274,957	280,981
Typhoid-Paratyphoid Vaccine, 1 cc. doses	93,788	94,635	88,908	89,297	98,412
Flexner Dysentery Vaccine—20 cc. vials	–	–	–	–	10
Diphtheria Toxin-Antitoxin Mixture, 1 cc. doses	419,347	474,881	420,003	461,930	373,467
Diphtheria Toxoid, 1 cc. doses	–	–	1,557	22,002	125,731
“ “ (Bulk) cc.	–	3,600	1,100	–	–
Scarlet Fever Streptococcus Toxoid, 1 cc. doses	–	–	–	563	21,156
Schick Outfits, 50 doses each	8,481	8,503	7,748	7,100	7,084
Scarlet Fever Streptococcus Toxin, 5 cc. vials	–	–	–	128	700
Tuberculin (ampoules—1.5 cc.)	39	734	1,925	2,362	3,630
“ (Bulk) cc.	–	100	550	–	–
Silver Nitrate Solution (ampoules)	52,215	64,423	61,586	60,399	60,284
Sodium Citrate Solution, vials	–	1,563	896	1,230	1,784
Diphtheria Toxin (Bulk) cc.	1,000	175	265	10	175
Diagnostic Serum, cc. Pneumococcus I—horse	135	415	1,015	1,270	550
“ “ “ “ II—horse	85	290	975	1,205	535
“ “ “ “ III—horse	80	255	1,080	1,325	620
“ “ “ “ V—horse	–	–	325	300	10
“ “ “ “ I—rabbit	–	–	–	57	172
“ “ “ “ II—rabbit	–	–	–	57	146
“ “ “ “ III—rabbit	–	–	–	57	159
“ “ “ “ V—rabbit	–	–	–	–	20
“ “ “ “ VIII—rabbit	–	–	–	–	10
“ “ “ Typhoid	8	10	26	22	14
“ “ “ Paratyphoid A	5	15	32.5	25	15
“ “ “ Paratyphoid B	2.5	20	35	25	15
Arsphenamine 0.3 gram (ampoules)	500	150	10	339	–
“ 0.4 “ “	273	384	590	202	125
“ 0.6 “ “	490	903	1,520	1,602	1,119
“ 2.0 “ “	100	25	–	–	–
“ 3.0 “ “	1,500	2,815	2,510	2,280	2,440
Sulpharsphenamine, 0.3 gram (ampoules)	1,502	3,552	1,676	2,045	1,780
“ 0.4 “ “	1,504	1,688	1,526	1,382	660
“ 0.6 “ “	4,269	11,575	7,033	4,655	4,800
“ 1.0 “ “	743	1,591	1,108	200	260
“ 3.0 “ “	455	1,253	661	268	180
Neoarsphenamine, 0.45 gram (ampoules)	4,419	10,228	8,606	12,320	14,948
“ 0.6 “ “	11,887	23,929	26,099	32,050	32,170
“ 0.9 “ “	3,303	8,649	9,203	13,880	18,200

For many of the products the quantities distributed are approximately the same as last year. Exceptions to this rule are the following:

(*a*) *Diphtheria Antitoxin.*—The distribution of this product continues to diminish owing to the decreased incidence of the disease; but the amount distributed in relation to the number of cases reported shows an increase.

(*b*) *Human Serum.*—The call for poliomyelitis serum has been very small because of the extremely low number of cases. On the other hand, the use of scarlet fever convalescent serum has increased as more towns have availed themselves of our services in preparing this serum for preventing the disease in persons in contact with scarlet fever.

(*c*) *Placental Extract.*—A study of this product designed for the prevention of measles has been undertaken in conjunction with the Department of Pediatrics, Harvard Medical School.

(*d*) *Diphtheria Toxin-Antitoxin Mixture.*—The decreased amount of this product is slightly more than offset by the increased demand for diphtheria toxoid.

(*e*) *Diphtheria Toxoid.*—This is being increasingly employed for immunization. In November for the first time there was more toxoid than toxin-antitoxin mixture distributed.

(*f*) *Scarlet Fever Streptococcus Toxoid.*—This product is used entirely in connection with the Department's study of its immunizing value.

(*g*) *Tuberculin.*—The use of tuberculin continues to increase rapidly. When its production was undertaken some years back, it was felt that approximately 800 cc. per year would be sufficient, but for the current year we are distributing something over six times this amount.

(*h*) *Diagnostic Serum. Pneumococcus.*—The increased use of the Neufeld method of typing has resulted in an increase in the amount of rabbit serum distributed and a decrease in the amount of horse serum. It is expected that eventually the use of horse serum will be very largely abandoned.

2. *Expenses*

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1930 . . .	$67,700 00	$67,698 66	$42,412 45	$42,253 09	$110,112 45	$109,941 75
1931 . . .	71,000 00	70,984 35	42,556 90	42,504 57	113,556 90	113,488 92
1932 . . .	71,500 00	71,481 70	37,314 70	35,528 06	108,814 70	107,009 76
1933 . . .	66,860 00	65,699 94	34,768 41	31,945 31	101,628 41	97,645 25
1934 . . .	63,530 00	62,478 89	38,234 98	33,417 44	101,764 98	95,896 33

The increased appropriation for expenses for 1934 was to cover the cost of installing a sprinkler system in certain parts of the laboratory and stables. Apart from this the total expenditures for personal services and expenses are somewhat below those of last year. Because of increase in prices for forage and the restoration of salary rates at the beginning of the fiscal year 1935, it is certain that this downward trend of expenditures will not continue.

3. *Improvements*

The major improvement in the plant has been the installation of a sprinkler system, referred to above. This takes care of the most likely sources of fire and should reduce our fire hazard very largely. No other improvements have been undertaken beyond the usual maintenance of the buildings and equipment.

4. *Personnel*

During the year Dr. Wilbur G. Malcolm, Senior Bacteriologist, was offered and accepted a better paid position with one of the large commercial biologic-products laboratories. His place was filled by the appointment of Dr. Leo Rane. Two vacancies in positions of the Laboratory-Helper grade, caused by resignations, were also filled. The number and grades of positions remain unchanged from last year.

5. *Education*

The demonstrations for medical and public health students and public health nurses held at the laboratory were attended by 362. The usual course in Applied Immunology was also given. Three students of the Simmons College course in Public Health Laboratory Methods took this course, and two of them received extra instruction by working in the laboratory. The laboratory has also had visitors from various parts of this country and from Australia, Cuba, Germany, Greece, India, and Mexico.

6. *Lectures and Addresses*

The Assistant Director and Director gave lectures and demonstrations in the course on Immunology at the Harvard Medical School and in the courses for graduates of the same school. There were also four other talks by the Director and Assistant Director outside the laboratory, attended by about 337 people.

7. *Investigations*

(*a*) The study of the preparation of scarlet fever streptococcus toxoid has been continued as has also its use in active immunization. A large number of individuals have been immunized and many of them rendered negative to the Dick test. It is too soon to determine how effective the immunity so produced will prove to be.

(*b*) The preparation of diphtheria toxoid, alum-precipitated, has been continued. None of it has been made available for human use. The work will be continued during the coming year.

(*c*) The work of the Pneumonia Study and Service has gone on and some of the experimental work is showing results. The routine methods of serum production have been reasonably well standardized. Sufficient serum has been produced to take care of the demand for it. From a standpoint of freedom from chill-producing activity, the serum produced recently appears to be much better than some of the earlier lots.

(*d*) An investigation somewhat similar to the Pneumonia Study has been undertaken on placental extract for the prevention of measles. This is being done in association with the Department of Pediatrics of the Harvard Medical School. As yet the study is still in its preliminary stages; but the extract appears to offer considerable promise of being a useful agent in the control of measles.

8. *Publications*

The following papers were accepted for publication but appeared after the close of the year:

1. Malcolm, Wilbur G. and Wyman, Louise: Hemolytic Streptococcus Toxins and Antitoxins. I. A medium for toxin production. Jour. Immunol., Vol. XXVIII, No. 1, January, 1935, p. 31.
2. Malcolm, Wilbur G. and Wyman, Louise: Hemolytic Streptococcus Toxins and Antitoxins. II. Titration by Rabbit Intradermal and Ear Tests. Jour. Immunol., Vol. XXVIII, No. 1, January, 1935, p. 33.
3. Malcolm, Wilbur G. and Wyman, Louise: Hemolytic Streptococcus Toxins and Antitoxins. III. Toxicogenic Variation in a Hemolytic Streptococcus Strain of Scarlet Fever Origin. Jour. Immunol., Vol. XXVIII, No. 1, January, 1935, p. 41.
4. Cianciarulo, Joseph and Malcolm, Wilbur G.: Hemolytic Streptococcus Toxins and Antitoxins. IV. The Concentration of Scarlet Fever Streptococcus Antitoxin. Jour. Immunol., Vol. XXVIII, No. 1, January, 1935, p. 47.
5. Barnes, L. A. and White, Benjamin, with the assistance of Clarke, Charlotte M.: The Antibody Response of Rabbits during Prolonged Immunization with Type I Pneumococcus Vaccines. Amer. Journ. Hyg., Vol. XXI, No. 1, January, 1935, p. 35.

9. *Inspection*

Dr. R. E. Dyer made his annual inspection on February 19, 1934. He also made an inspection on July 18 and the U. S. Treasury Department license to manufacture and sell biologic products was continued.

II. WASSERMANN LABORATORY

WILLIAM A. HINTON, M.D., *Chief of Laboratory*

1. *Tests and Examinations*

The following table shows the tests done by the Wassermann Laboratory for the last five years. All figures are for calendar years. The total number of tests performed shows a decrease, owing to the fact that in previous years Wassermann tests have been done on all blood samples submitted and Kahn tests as well as

Hinton tests on a large proportion of them. On April 1 the routine use of the Wassermann test was discontinued, the Hinton test becoming the routine method for the examination of blood for syphilis. The total number of specimens examined for syphilis for 1934 is 119,819, an increase of thirteen per cent over the figure of 106,211 for 1933. The use of the Hinton test in place of the Wassermann has proved to be more economical. It has also increased the accuracy of the detection of syphilis, the Hinton test showing about twice as many cases of syphilis as did the Wassermann test.

	1930	**1931**	**1932**	**1933**	**1934**
Wassermann Tests	89,864	97,444	100,948	106,211	40,125
Kahn Tests	3,822	12,735	15,059	18,541	4,260
Hinton Tests	13,060	15,412	22,167	30,371	95,036
Modified Hinton Tests	12,025	–	–	–	–
Gonococcus Fixation Tests	2,790	2,560	3,195	3,657	4,343
Lange's Colloidal Gold Tests	50	79	107	106	178
Complement Fixation Tests for Glanders	30	32	27	74	37
Specimens of Milk Examined for Tuberculosis	–	1	–	–	–
Agglutination Tests for Brucella Abortus	–	–	258	–	–
Diagnostic Examinations for Division of Animal Industry:					
(*a*) Complement Fixation Tests for Glanders	78	13	5	11	17
(*b*) Examinations for Rabies	460	515	265	301	496
(*c*) Pathologic and Bacteriologic Examinations	35	32	22	21	14
(*d*) Agglutination Tests for Brucella Abortus	8,643	8,966	10,077	11,921	14,653
(*e*) Specimens of Milk Examined for Tuberculosis	52	–	–	–	–
	130,909	137,789	152,130	171,214	159,159

The other tests carried out by this laboratory show in general an increase over last year, particularly the gonococcus complement fixation test, the examinations for rabies, and the agglutination tests for Brucella abortus.

The average cost per test was 13.1 cents, a figure lower than any previous year excepting 1933, when it was 12.3 cents per test.

2. *Expenses*

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1930	$16,500 00	$15,935 42	$5,704 75	$5,688 54	$22,204 75	$21,623 96
1931	16,600 00	16,591 76	5,213 34	5,213 34	21,813 34	21,805 10
1932	17,000 00	16,409 86	5,200 80	5,144 12	22,200 80	21,553 98
1933	15,990 00	15,654 38	5,000 00	4,916 27	20,990 00	20,570 66
1934	15,700 00	15,498 99	5,219 45	5,142 48	20,919 45	20,641 47

The expenses for 1934 are about the same as for 1933. The change in method of testing blood for syphilis permitted examination of the increased number of specimens with the same personnel as formerly and in addition the number of positive diagnoses was increased by the change in method.

3. *Education*

In addition to these routine activities, the Wassermann Laboratory has furnished instruction to men in the second year class of the Harvard Medical School; to a special class of twenty senior students from Simmons College; and to one special student in the graduate department of Simmons College.

REPORT OF DIVISION OF CHILD HYGIENE

M. Luise Diez, M.D., *Director*

The chief activities of the Division of Child Hygiene for the year ending December 31, 1934, are reported as follows:

1. Activities of the Various Sections
    1. *Maternal, Infant and Preschool Hygiene:*
        - (*a*) Maternity Service
        - (*b*) Mothers' Classes
        - (*c*) Well Child Conferences
        - (*d*) Summer Round-Up
    2. *School Hygiene:*
        - (*a*) Health Awareness Tests
        - (*b*) Health Education Courses
        - (*c*) Health Education in Secondary Schools
        - (*d*) High School Health Councils
        - (*e*) School Lunch Projects
        - (*f*) School Hygiene Surveys
        - (*g*) Superintendents' Clubs
        - (*h*) Heart Lesions in School Children
        - (*i*) School Hygiene Statistics
        - (*j*) "Contact"
        - (*k*) School Hygiene Handbook
    3. *Public Health Nursing:*
        - (*a*) Tuberculosis Nursing
        - (*b*) Communicable Disease Nursing
        - (*c*) School Nursing
        - (*d*) Hospital Training Schools
        - (*e*) Home Hygiene Classes
        - (*f*) Continuation Courses
        - (*g*) Public Health Nursing Institutes
        - (*h*) Scholarships for Nurses
        - (*i*) School Lunch Survey
        - (*j*) Nursing Club Activities
        - (*k*) General Nursing Service
    4. *Nutrition:*
        - (*a*) Nutrition Advisory Committee
        - (*b*) School Lunch Survey and Follow-Up
            1. New School Lunch Service—Nutritionist for Communities
            2. Examples of Other Services—Williamsburg—Boston
        - (*c*) Well Child Conferences
        - (*d*) Chadwick Clinics
        - (*e*) Summer Camps
        - (*f*) Nutrition Courses:
            1. Fitchburg State Teachers' College
            2. University Extension Courses for Teachers
            3. Courses for Mothers
            4. Courses for Nurses in Training
        - (*g*) Group Talks
        - (*h*) Consumers' Council
        - (*i*) Food Customs from Abroad
        - (*j*) Dental Nutrition Studies
        - (*k*) Other Nutrition Studies
        - (*l*) Federal Emergency Relief and Public Welfare Food Plans
        - (*m*) Better Nutrition Picture

5. *Dental Hygiene:*
    - (*a*) Dental Nutrition Program
    - (*b*) Dental Studies
    - (*c*) Dental Certificates
    - (*d*) Preschool Dental Clinics
    - (*e*) School Dental Clinics
    - (*f*) "Protect Your Smile"
    - (*g*) Well Child Conference Program
    - (*h*) General

6. *Health Education:*
    - (*a*) In the Schools
    - (*b*) Outside the Schools
    - (*c*) Publicity
    - (*d*) Exhibits, Posters, Pamphlets
    - (*e*) Library
    - (*f*) Lectures, Motion Pictures, etc.
    - (*g*) Prenatal and Postnatal Letters and Fathers' Letter

II. Special Projects
1. Federal Emergency Relief Administration
   Civil Works Administration
   Civil Works Service
2. Staff Education

III. Personnel of the Division

I. Activities of the Various Sections

1. Maternal, Infant and Preschool Hygiene:

(*a*) *Maternity Service:*

At the close of the calendar year there were on the registry for the monthly prenatal letters, and letters to fathers, approximately 858 names; for the first year postnatal letter service, 13,344 names, and for the second year postnatal service, a total of 13,229 names. This makes a total for all 27,431 names, as compared with 23,000 registered for the previous year.

The Division Staff cooperated with the Division of Child Guardianship of the State Department of Public Welfare, assisting in the revision of "Rules and Regulations Governing Maternity Hospitals and Homes." These are to be included in the next issue of the Department Manual of Laws Relating to Public Health.

(*b*) *Mothers' Classes:*

The Public Health Nursing Consultants assisted, as in previous years, in the formation of Mothers' Classes in the local communities. Four such classes were conducted for the mothers in Worcester, with an average attendance of fifty. Since the classes were organized over 200 mothers have been enrolled.

Classes for mothers of preschool children were organized in Amherst, in connection with the local well baby weighing conference.

(*c*) *Well Child Conferences:*

Well Child Conferences were held in 31 towns, including those held at the Reformatory for Women, at Framingham. A new procedure this year was the inclusion of vision tests at a number of the conferences, these being given by Dr. Anne Stewart, a volunteer worker.

Of the 212 communities in which the State Demonstration Well Child Conferences were held during the years—1924 to 1934 inclusive—48 are now conducting local Well Child Conferences, with a physician in attendance, and 20 have local weighing and measuring conferences with a nurse in charge.

A summary of Well Child Conference examinations for the years 1931, 1932, 1933 and 1934 gives the following information:

Table I—*Summary of Examinations*

	1931		1932		1933		1934	
	Pre-School	Entering School	Pre-School	Entering School	Pre-School	Entering School	Pre-School	Entering School
Number examined	973	192	1,243	627	1,100	549	989	510
Number with defects	631	176	888	607	900	518	835	493
Percentage with defects	65%	92%	71%	97%	82%	94%	85%	97%

Table II.—*Defects Found*

	1931		1932		1933		1934	
	Pre-School	Entering School	Pre-School	Entering School	Pre-School	Entering School	Pre-School	Entering School
Teeth	159	93	273	454	332	391	391	377
Nutrition	129	23	203	421	366	322	342	283
All other defects	614	305	1,020	982	1,374	1,087	1,267	1,026

The Well Child Conference figures for the year 1934 are as follows:

Number of Well Child Conferences held during 1934 (31 towns)	37
Number of children examined	1,795
Number of examinations	1,923

In Wayland, 11 Well Child Conferences were carried on during 1933 and 1934 where 129 children were given 207 examinations. A total of 277 defects were found: 27 were reported corrected at the last meeting. Of the children attending once or more, 59 entered school in the Fall of 1933 or the Fall of 1934.

At the conferences for the Preschool Centers in Chicopee, under the Federal Emergency Relief Administration, in January, June and December, 174 children were given 233 examinations.

At Framingham State Reformatory for Women, 68 babies were given 107 examinations. The "repeats" in this group examined in December showed a very great improvement since the previous conference.

In Nantucket the fourth demonstration Well Child Conference was held during the early summer, organization for this activity being carried on by the public health nursing consultant covering that district. Through the cooperation of the Nantucket Public School Association a physician was employed to assist the department pediatrician in the examinations of the children. It is hoped that the coming year will see this conference conducted by the local organizations as regards medical service, this Department cooperating by providing the services of a nurse, a nutritionist and a dental hygienist.

Similar organization service was rendered by the consultant nurse for the sixth annual Well Child Conference for Martha's Vineyard. From this project a series of nutrition classes was developed for the mothers attending the conference. These classes were conducted by the nutritionist attending the conference, and were well attended and much appreciated.

On Cuttyhunk Island the Well Child Conference was held for the fourth time. As is the usual custom for the Island, the examinations included the school children as well as those of preschool age. An event for those who live on Cuttyhunk Island was the showing of health moving pictures, with two additional films loaned by the State Department of Education.

The conduct of the local Well Child Conference at Falmouth has been reorganized to include the employment of volunteer workers to assist in the weighing and measuring of children and recording, thus permitting the nurses to spend more time in health teaching at the conferences. This change was brought about through the efforts of the nursing consultant of the Department.

The Department unit carried on Well Child Conferences also in Ashburnham, Avon, Clinton, Ipswich, Lakeville, North Easton, Rowley and Seekonk, in the eastern section of the State, and in Worcester County. The following communities in the western district were given the services of a demonstration Well Child Conference during the year: Chester, Deerfield, Hinsdale, Montague City, Northampton, Peru, Southampton, Washington, Westhampton and Williamsburg. Of these, there were only two towns in Franklin County where the Department conducted the conference during the year—Deerfield and Montague City. These conferences stimulated particular interest in the preschool age group for whom no work had been done in several of the communities.

The nursing consultants assisted in the plans for the conduct of local Well Child Conferences in Huntington, Northbridge, Saugus and Uxbridge. In Saugus a permanent Well Child Conference was established in accordance with plans outlined by the nursing consultant of the Department, for the use of the local physician, and in Hamilton a permanent conference was established also as a result of the demonstration conference held previously by the Department. Organization for a Well Child Conference was carried out by the consultant nurse also for the Topsfield Fair, to take the place of the usual "baby show" held there in previous years.

In the western district the town of Monroe conducted its own conference at which the nursing consultant assisted. In Rowe a permanent conference was organized as an activity of the Community Health Committee, with a physician, dental hygienist, nurse and nutritionist attending.

In Conway the local Parent-Teacher Association sponsored the Well Child Conference for the second consecutive year. Other towns in Franklin County carrying on their own conferences locally were Erving, Leverett, New Salem, Shutesbury and Wendell.

Throughout the year considerable time was spent in organizing for a Well Child Conference demonstration which will be sponsored by the Women's Club in Amherst, and held early in the coming year, the Welfare Committee of the Club to act as a Well Child Conference Committee to concentrate on this activity.

(*d*) *Summer Round-Up:*

The Division of Child Hygiene cooperated with the Parent-Teacher Associations and local organizations and nurses in providing printed matter and advice for the conduct of a Summer Round-Up locally. We have received information from 135 communities where Summer Round-Up was carried on during the year. In Ashland the Visiting Nursing Association took definite steps to provide a physician to assist in carrying on the Summer Round-Up locally, as a result of activity on the part of the consultant nurse for that district.

2. School Hygiene:

(*a*) *Health Awareness Tests:*

An interesting project in the field of school hygiene during the year was the giving of the Health Awareness Test, prepared by the American Child Health Association, to 2,000 sixth-grade children in different types of communities in different sections of the State. The test showed that Massachusetts children are approximately on a level with groups of children in different parts of the country to whom the same test has been given. Detailed studies will be made of the material provided by these tests with relation to methods of health teaching in particular.

(*b*) *Health Education Courses:*

Courses in health education, for teachers, were given in eleven towns to seven groups, reaching in this manner 331 teachers. Six periods comprised the course. Through single talks in other communities sixty-five additional teachers were reached.

(*c*) *Health Education in Secondary Schools:*

The Director of the Division of Child Hygiene served as a member of the Committee of the State Department of Education, to formulate a Course of Study in Health Education for Secondary Schools. The Director participated also in a meeting of school physicians held in Saratoga, New York, for the discussion of problems relating to school health work.

Steps were taken toward the improvement of health education work in the secondary schools in three towns—Athol, Rockport and Winchester. In Athol and Rockport impetus came from a course in health education. In Winchester through contact with the superintendent of schools on several occasions, particular interest followed a health education conference held in the high school in the spring.

In Athol the faculty of the junior high school became active in developing a program, the health education worker of the Department doing the detailed work required. A Charm School was held for the girls in the senior high school, and the teacher of English initiated health education work in the same high school.

In Rockport the high school teachers, cooperating with the superintendent of schools and the physician from the Department, made a contribution to the State in the form of a standardized examination in health awareness for high school students.

In Winchester the high school faculty outlined for this particular course the correlation with health education.

In Amherst Junior High School a health council was organized and functioned around a "Save Your Smile" campaign and a Health Club, with health instruction given by physical education, home economics and science teachers and the school nurse.

A four-lesson course in Charm was given in Chelmsford, Charlemont, Amherst, Greenfield, Shelburne Falls, Westford and Williamsburg.

(*d*) *High School Health Councils:*

The High School Health Council was continued in South Hadley. A check-up of defective hearing cases and first-year students was made through the use of an audiometer early in the year. A later student activity was a survey of light intensity by means of a sight meter, the outcome of which was that recommendations were made to the school committee for more adequate lighting which the survey showed was much needed.

(*e*) *School Lunch Projects:*

Following a course of lectures for teachers in the town of Williamsburg, that community was selected for the purpose of experiment to see what could be done to improve the school lunch situation, through cooperative effort on the part of all those involved in such a project. A central committee was formed including representatives of the following organizations: Superintendent of Schools, President of the Woman's Club, Principal of Williamsburg High School, Principal of Haydenville School, school nurses and teachers of the town, Amherst State College, Hampshire County Extension Service, a physician, a parent, Public Health Nursing Consultant of this Division, as well as the Nutrition Consultant and another nutritionist of the Department, the detailed work being done by the nutritionist. A complete report of this project will appear later in this report.

(*f*) *School Hygiene Surveys:*

School hygiene surveys were made in Athol and Uxbridge, and recommendations made for improvement in the service.

(*g*) *Superintendents' Clubs:*

The school health conferences which had been conducted for a number of years were discontinued last year because it seemed that they had outlived their usefulness. In order that the contact with the superintendents of schools might not be lost, the Superintendents' Clubs were approached to see if they would be willing to devote one meeting a year as a health meeting at which new developments in the school health program might be discussed. Through these meetings 76 superintendents of schools were contacted in 1934.

(*h*) *Heart Lesions in School Children:*

In response to a request from Lawrence, arrangements were made for the examination of certain students in one of the larger school buildings where the incidence of heart lesions was reported to be very high. Dr. T. Duckett Jones rendered valuable assistance in these examinations and determined that the percentage of heart lesions found was no higher than the average for the State.

(*i*) *School Hygiene Statistics:*

With the assistance of Miss Angeline Hamblen, statistician of the Department, figures were compiled on school hygiene in Massachusetts for 1932–1933. Most gratifying is the fact that the average time spent on the examination of school children by the physician is five minutes per child. There is still much to be desired in the matter of health education in high schools.

(*j*) *"Contact":*

"Contact"—a bulletin for school superintendents and school physicians, was started upon its career and has been very favorably received. It is to be issued four or five times yearly.

(*k*) *School Hygiene Handbook:*

A new edition of the School Hygiene Handbook was prepared during the year. This required considerable time and effort on the part of the staff and numerous conferences with the nursing consultants for the discussion of school nursing technique and policy in that branch of the school service. This included also a revision of the Daily and Monthly Report of the School Nurse form.

3. Public Health Nursing:

(*a*) *Tuberculosis Nursing:*

Of special interest is the tuberculosis program for Nantucket and Martha's Vineyard. Considerable time was spent assisting the local nurses in plans for better organization for the use of the clinics established the previous year. In Nantucket, clinics are held once in two months, and in Martha's Vineyard clinics are held monthly. In the latter clinics 108 patients were examined.

Considerable improvement is noted in the conduct of the tuberculosis program in the Cape Cod towns, following conferences with representatives of the Cape Cod Union Health District, the local sanatorium, the Massachusetts Tuberculosis League, the boards of health, visiting nursing associations and public health nurses in the district, and members of the Tuberculosis Division of the Department. In furthering this program the consultant nurse secured the services of Dr. Philip Jacobs of the National Tuberculosis Association as speaker for the Cape Cod Public Health Club meeting. The new organization of school tuberculosis clinics makes for continued improvement in all the towns.

At Worcester County Sanatorium, Boylston, a diagnostic clinic was organized for the towns surrounding Boylston, the consultant nurse of this Division cooperating with the Tuberculosis Division Consultant in this project. Many conferences were held with local physicians, nurses, boards of health, the superintendent of the sanatorium and the State District Health Officer to further the progress of this clinic, which is held monthly.

In Uxbridge special attention was focussed on the tuberculosis situation. Advice and assistance were given by the consultant nurse to the representative of the Emergency Relief Administration with regard to a program of tuberculosis case finding. Some time was spent in contacting patients recommended for sanatorium care, while awaiting entrance to sanatoria.

In Grafton, concentrated assistance was given the community nurses individually on their tuberculosis programs. A system of record-keeping was installed and plans made for better follow-up of old cases, as well as better case finding.

Arrangements were made with Dr. Sumner Remick, Superintendent of Middlesex County Sanatorium, for a post-mortem meeting at the sanatorium for full-time tuberculosis workers. Plans were made with the Superintendent of Lawrence Memorial Hospital for a tuberculosis consultation clinic from the County Sanatorium. Special studies were made of nursing follow-up of reported tuberculosis cases.

Children recommended by the Chadwick Clinic for sanatorium care were followed up and in most instances admitted to the sanatorium or were under the care of a private physician. The consultant nurses visited tuberculosis camps and assisted in their camp programs.

(*b*) *Communicable Disease Nursing:*

Successful toxin-antitoxin clinics were held in Duxbury, Foxboro and Holbrook, the nursing consultant for the district assisting in the organization of these clinics and rendering active service in the two latter clinics. Through a talk before the Visiting Nursing Association and the showing of a diphtheria prevention moving picture film in Hanover, a large number of preschool children were immunized last spring, and special effort was made to increase the number of immunizations carried on in several towns of the district. A demonstration clinic was carried on in Hingham, the consultant nurse assisting the district health officer in this project. Similar activities were carried on in Deerfield.

In Framingham assistance was given with Dick testing and in Arlington a conference was held with the board of health concerning the responsibility of the local nurse with regard to venereal disease work. At a meeting of the Essex County branch of the Massachusetts Organization for Public Health Nursing, exhibits were displayed showing biologic products of the Department and nursing technique in communicable disease.

(*c*) *School Nursing:*

In Somerset, at the request of a member of the school committee, the nursing consultant formulated a tentative nursing policy, standing orders for the school nursing service in the town and assisted the nurse in field visits in the town. Supervisory visits were made with school nurses in other communities at their request.

The school daily and monthly report forms issued by the Department, and revised recently for inclusion in the School Hygiene Handbook, are being used in a number of towns throughout the State.

The usual contacts were made with the local school nurses by the nursing consultants of the Department, and other members of the staff.

(*d*) *Hospital Training Schools:*

The following subjects were included in the series of lectures for hospital training schools for nurses: The History of Public Health and Public Health Nursing; Communicable Disease Control; Tuberculosis; Syphilis and Gonorrhea; Maternity Hygiene; Child Hygiene; Nutrition; Dental Hygiene; School Hygiene; Organization; Publicity; and Social Service in Relation to Public Health.

In the spring, this course of lectures was completed at Burbank Hospital, Fitchburg; State Hospital, Westborough; City Hospital, Worcester; State Sanatorium for Tuberculosis, Rutland; Leominster Hospital; Clinton Hospital; and Lawrence Memorial Hospital, Medford. Later in the year similar courses were given at Hahnemann Hospital, Worcester; Leominster Hospital; Memorial Hospital, Worcester; St. Elizabeth's Hospital, Boston; and Chelsea Hospital. Through this series of lectures more than 400 student nurses were reached.

A course of nine lectures was given at Faulkner Hospital, Boston, to a class of sixteen nurses.

A series of four lectures was given to post-graduate students at Essex and Middlesex County Sanatoria, nineteen nurses being reached in this manner.

To senior nurses in Cooley Dickinson Hospital, Northampton, and Farren Hospital, Greenfield, a sixteen-lecture course was given, followed by two sessions at which moving picture films were shown furthering health education.

For the second time a series of twenty-one lectures was given at Hillcrest Hospital, House of Mercy Hospital and St. Luke's Hospital, all in Pittsfield; also in North Adams Hospital.

(*e*) *Home Hygiene Classes:*

The consultant nurse for Worcester County District assisted the Extension Service of Amherst State College in the preparation of material on home hygiene and care of the sick.

In the schools in many of the towns the Unit in Home Nursing and Child Care, issued by the State Department of Education, has been given either by the school nurse or by a qualified teacher. In Provincetown this course was given in both the eighth and ninth grades, three classes being held regularly. The Unit was given in Ashby and was included in the regular curriculum, and in Adams, Barre, Northfield, Orange and South Hadley interest was sufficient for the desire to include this Unit in the curriculum for the coming year. This project required many conferences with school nurses and others to stimulate interest and organization for the furtherance of this type of education.

(*f*) *Continuation Courses:*

In May the continuation courses on the subject of "The Psychological Approach to Child Health" were held in Boston, Holyoke and Worcester.

The subject for the fall courses was "Mental Health," and the courses were held at Worcester State Hospital, Northampton State Hospital, and the Metropolitan State Hospital, Boston. Previous to the establishment of this series of courses the Director of the Division and the Public Health Nursing Consultant giving the courses, attended a two-day conference on the subject, held at the Medical Center, New York City. With Dr. Barrett, Dr. Whitney, Dr. Halloran and Dr. Bryan of the State Department of Mental Diseases, plans were completed for giving the courses in Massachusetts, based on the course given in New York State.

(*g*) *Public Health Nursing Institutes.*

An outstanding activity in the field of public health nursing during the year was the planning and holding of four Public Health Nursing Institutes in the Southern Berkshire District, the Nashoba District, the Cape Cod District and in Northampton. These were sponsored by the Commonwealth Fund and the State Department of Public Health, and the general topics discussed were Child Health, School Nursing, and General Public Health Nursing.

The Department itself held two Regional Institutes in Boston and Springfield, the program of which was under the direction of Miss Ada Boone Coffey, Chief Consultant in Public Health Nursing. Unusual interest was noted in both Institutes and the attendance surpassed our expectations.

We participated also in a local Institute for the Town of Holden primarily, and assisted the Massachusetts Tuberculosis League in the program of their Institutes on Tuberculosis, held in Brockton, Salem and Winchester.

(*h*) *Scholarships for Nurses:*

During the year scholarships at East Harlem Nursing and Health Center, New York, were awarded to the following nurses, by the Commonwealth Fund: Southern Berkshire District—Miss Pease and Miss Kezer; Nashoba District—Mrs. Genevieve Creeley; Cape Cod District—Miss Batt; Southeastern District—Mrs. Gooch; Worcester County District—Miss LeMay.

There is certainly no question as to the value of these two-months' scholarships at East Harlem. In every instance following these scholarships, marked interest in the development of nursing programs, better nursing technique and greater stress on teaching have been evident.

Through the Commonwealth Fund a four-weeks' travel scholarship was awarded Miss Woodbury, Director of the nursing service of the Southern Berkshire District.

With the assistance of the nursing consultants, questionnaires were filled out for the Commonwealth Fund concerning the value of these scholarships, following a field visit with the nurses having been awarded this privilege. Two other definite requests were filed from nurses in the Cape Cod district for scholarships at East Harlem, and it is hoped that the Commonwealth Fund will continue to offer this valuable service to the nurses of this State.

Miss Nelson, school nurse of Provincetown, took a two-weeks' course at Fitchburg State Teachers College during the summer.

(*i*) *School Lunch Survey:*

The School Lunch Survey required considerable time on the part of the Public Health Nursing Consultants organizing for this important study which will be reported in greater detail later in this report.

For the schools of Worcester County, a hot lunch program was established through the efforts of the consultant nurses of that district. Conferences were held with representatives of Southern Worcester County Public Health Association, Northern Worcester County Public Health Association, and Worcester County

Extension Service, concerning this activity. In Middlesex County a similar meeting was held with the Extension Service, at which the nutrition consultant presented the needs of the school lunch survey. The following towns were thus contacted: Hopedale, Lincoln, Milford, Millbury, New Braintree, Uxbridge, West Brookfield, and all towns included in the districts covered by the representatives attending these conferences.

(*j*) *Nursing Club Activities:*

It was most stimulating to note the increased interest in the Health Clubs for Public Health Nurses and other health workers. In the Cape Cod district where the Club has been carrying on for several years, more local responsibility and participation in health activities were evident. An event of note was the fact that the newly formed Barnstable County Health Council, organized by the Barnstable County Medical Society, asked the Cape Cod Health Club to appoint two of its members as delegates to the Council. The public health nursing consultant was chosen as one representative.

The Southern Berkshire Health Workers' Club continued its activities for the second year and served a very useful purpose for that section of the State.

Northern Worcester County Public Health Association was most active during the year and the consultant nurse for the district assisted in arranging the excellent programs sponsored by the Club.

Blackstone Valley Public Health Club continued to hold the interest of its members and served the district to good advantage.

(*k*) *General Nursing Service:*

In several of the nursing districts interest was centered upon the formation of community health committees for the furtherance of health activities locally, including public health nursing and the disposition of social problems.

The board members of local visiting nursing organizations were contacted frequently concerning resources for their development, the writing of annual reports, publicity suggestions and program planning.

Record-keeping systems were recommended to a number of communities and installed in some of them, and record supervision was afforded the nurses in these communities. Reading courses were planned for the nurses in various communities and frequent conferences held on current problems. In Hyannis a book exhibit was shown.

Contacting the industrial nurses was another activity in one of the nursing districts, thus bringing about better cooperation and closer relationship of these nurses in the public health nursing program.

In the western district the nursing consultant reported that she had contacted every nurse in the district during the year, and reported much better work being carried on since the local nurses attended the Public Health Nursing Institutes held in the district. This was evident particularly with regard to record keeping by the nurses and greater interest on the part of the board members of the visiting nursing associations.

In Cohasset the nursing service was reorganized and the nursing consultant met with the nursing committee of the town several times, outlined a nursing policy, recommended qualification standards for applicants for the nursing position, and was asked to give supervision to the nurse appointed. In Needham new nursing service was established and a part-time nurse appointed under the Board of Health. In Seekonk new service was also initiated and a nurse appointed.

Cooperation was effected with the Red Cross chapters in the three counties of the western section of the State—Franklin County, Hampshire County and Berkshire County—in matters pertaining to health programs.

In Martha's Vineyard a public health nursing exhibit stimulated interest generally when displayed at Martha's Vineyard Fair.

In the Nashoba area the nursing consultant was successful in carrying on a health education project in the towns of Stow and Harvard, through an exhibit and lecture to mothers. Following this a "Parents' Shelf" was installed in the local library for reference books of special interest to parents. In their contacts with local nurses the value of adequate prenatal care for prospective mothers was stressed, bringing to their attention the prenatal and postnatal letters of the Department as an important aid in this respect. The facilities of the Department were offered by the consultant nurses in their contact with local nurses at exhibits, local fairs, classes and lectures.

Frequently during the year talks were given to groups of high school students on "Nursing as a Profession." Stress was laid upon the educational requirements for entrance to accredited training schools for nurses, to impress the students with the importance of the knowledge of certain required subjects. All high schools in Southern Worcester County and three in Middlesex County were thus contacted, as well as several in the western section of the State.

In cooperation with another nurse member of the Zonta Club in the western district of the State, interest of the Club was secured in the matter of correction of defects found in children of the Northampton area, preferably those examined at the Well Child Conference in Northampton. To cover necessary expenses $100 was raised and this service will become the chief activity of the Club during the coming year.

All the consultant nurses attended the district meetings of the Massachusetts Organization for Public Health Nursing. One consultant served as district chairman and was instrumental in having selected for the district committee a representative of the board of health, a physician and a school superintendent. Another served as vice-chairman of the organization for the Southeastern district and included in its spring meeting as part of the program an exhibit on public health nursing.

The district meetings of the National Organization for Public Health Nursing were attended also by the consultant nurses, one consultant attending the Annual Meeting held in Washington, D.C. Another nursing consultant was appointed as vice-chairman of the Membership Committee of this Organization.

The consultant nurse for the Connecticut Valley District attended the annual meeting of the American Public Health Association held in Pasadena, California.

4. Nutrition:

(a) *Nutrition Advisory Committee:*

A meeting of the Nutrition Advisory Committee was called by the Commissioner of Public Health, to meet with organizations concerned with the School Lunch Survey. They rendered their usual valuable assistance in the discussion of nutrition problems incident to this program.

(b) *School Lunch Survey and Follow-Up:*

Because of the children's need this year Massachusetts woke up to the ever-present problem of the school lunch—one of the three necessary meals in the day for the school child. In order to combine all forces advantageously a working school lunch committee was appointed by the Commissioner of Public Health, made up of the Chairman of the Child Welfare Division of the Massachusetts Federation of Women's Clubs, representatives from the State Department of Education and the Extension Service of Amherst State College, with the Consultant in Nutrition of this Department acting as secretary.

The committee decided that first a survey should be made by responsible women in the local communities to find the need and share the responsibility in meeting it. The survey has been made in 163 cities and towns. With the assistance of our statistician, the figures were studied and from the returns of the first 46,000 children either bringing their lunches or buying them at school, it was found that:

Only 1 child out of 4 had milk.
Only 1 child out of 5 had fruits and vegetables.
Only 1 child out of 7 had dark bread.
Only 1 child out of 5 had as long as 20 minutes for eating lunch.
Only 1 child out of 9 was getting a hot dish.

This indicated that children were eating unbalanced lunches, even though nineteen types of organizations were giving assistance.

The Commissioner of Public Health reported to each superintendent of the school concerned, noting the needs found, and suggesting the appointment of a local committee to work with him to meet these needs. Results thus far have been that *more needy children* are being supplied with lunches, more responsible local organizations are working toward improving the school lunches, and more nutrition education of children, parents and teachers is being carried on.

For this survey a school lunch survey card was prepared and issued by the Department of Public Health. After finding the needs, a "Measuring Stick for a Good School Lunch" was prepared and sent, by the thousands, to children to use in the school and take home to their parents. A child silhouette exhibit, illustrating the findings in the survey, was made and used extensively over the State at meetings of superintendents of schools, school nurses, and club meetings of various kinds.

A report of the School Lunch Survey was sent to the State Commissioner of Education and to the Federal Emergency Relief Administrator at Washington, as well as to the State Federation of Women's Clubs, the Red Cross, Parent-Teacher Associations and various other organizations interested in the study.

A paper was written on the subject by the Consultant in Nutrition and the Statistician and sent to the Nutrition Advisor of the Federal Emergency Relief Administration in Washington. This was later printed in the September issue of "Practical Home Economics," and permission was granted for its reprinting in "The Trained Nurse and Hospital Review."

The section devoted to school lunches in the "School Hygiene Handbook" was rewritten during the year.

1. *New School Lunch Service—Nutritionist for Communities:*

In the fall one nutritionist was assigned definitely to the project of contacting school lunch committees and managers in the local communities, so as to stay long enough to advise with them regarding their plans and problems pertaining to the school lunch. The plan also included reaching the children themselves to secure a good lunch whether it be provided at home or at the school. An interesting table of statistics follows:

Conferences with:	School Lunch Committees	7
	Parent-Teacher Associations	5
	Well Child Conference	1
Talks given:	In schoolrooms	7
	To teachers—Holden	1
	To mothers' groups	3

In contacting school lunch committees in eight towns, stress was laid upon the necessity for a hot dish at the noon lunch for children; low cost menus; economical buying; efficient and attractive serving of food; ways to introduce more fruit and vegetables in the school lunch.

In the Parent-Teacher Associations, 118 members were contacted, and advice given on the hot dish in the school lunch, good nutrition and the means of providing adequate lunches for the children.

The schoolroom talks covered lunchbox suggestions and the "School Lunch Measuring Stick," and for the Mothers' Groups and the Well Child Conference stress was laid upon protective foods for children, economical buying of food, lunchbox suggestions and children's diets and habits.

As a result of these meetings a need was felt for definite aid to untrained lunchroom managers, so the Department prepared a series of menus and recipes in quantity, consisting of three weeks' menus for autumn, for winter, and for spring, printed on cards for distribution.

The towns covered so far in these contacts were Becket, Carlisle, Haverhill, Holden, Housatonic, Lenox, Monterey, Otis, Richmond, Seekonk, Sheffield, Tyringham, West Springfield and West Stockbridge.

2. *Examples of Other Services:*

Williamsburg—School Lunch:

One outstanding project in school lunches was that carried on in Williamsburg, at the request of Dr. Moore, the Consultant in School Hygiene of the Department.

A nutritionist spent four weeks in that community, carrying on a school lunch survey in all the schools, giving talks in every grade in the schools. An interested committee of school department representatives, state organization representatives, and the local community generally, was formed. The school committee was approached with a request for tables and benches in the school lunchrooms; high school pupils were assigned to their classrooms to eat their lunches, relieving the overcrowding in the lunchrooms, suggestions for lunch menus were sent home with the children to interest the mothers in preparing this important meal.

Boston—School Lunch.

A study was made of the school lunch procedure in the schools of the City of Boston, through the Child Welfare Committee of the Boston City Federation of Women's Clubs, the Nutrition Consultant of the Department conferring with those carrying on the survey. A report of the findings was submitted to the School Department of Boston, after which the Superintendent of Schools directed that a platoon system of lunch periods be arranged with the school principals, and that candy should not be sold between periods in the schools. A "Measuring Stick for a Good School Lunch" will be distributed to the school children.

(*c*) *Well Child Conferences:*

Included in the Well Child Conference unit of the Department is a nutritionist from the Division. An interesting summary of the nutrition conferences held at these Well Child Conferences for the past three years gives the following statistical information, for all the conferences, and for a particular series of conferences held in the city of Northampton.

Summary of Nutrition Conferences on All Well Child Conferences for the Past Three Years

Number	1932	%	1933	%	1934	%
Children	1,830		1,801		1,619	
Families	1,219		1,406		1,393	
Showing good nutrition	1,209	(66)	1,049	(58)	958	(59)
Showing slight defect	406	(22)	494	(27)	453	(28)
Showing moderate defect	169	(9)	170	(10)	137	(9)
Needing immediate attention	46	(3)	78	(5)	71	(4)
Needing more milk	326	(18)	473	(26)	466	(29)
Needing more fruit	737	(40)	646	(36)	557	(35)
Needing more vegetables	878	(48)	810	(45)	763	(47)
Needing budget advice	303	(17)	276	(15)	336	(21)
On welfare aid					168	(10)
Needing more whole grains					563	(35)

Summary of Nutrition Conferences Held at Northampton—Two Years

Number	1933 %	1934 %
Showing good nutrition	54	53
Showing slight defect	31	32
Showing moderate defect	13	11
Needing immediate attention	2	4
Needing more milk	18	33
Needing more fruit	30	40
Needing more vegetables	39	65
Needing more whole grains	–	43
Needing budget advice	21	29
On welfare aid	–	14

In the above the figure given for those on welfare aid includes also those on "work relief." The close comparison between the figures for 1933 and 1934 for all the conferences is of interest.

Another interesting summary was made of recommendations advised at the Well Child Conferences held in the Southern Berkshire district, as follows:

Number of children seen in conference	139
Needing more milk	30%
Needing more fruit	27%
Needing more vegetables	47%
Needing more whole grains	20%
Needing budget advice	16%

A well-organized Well Child Conference was substituted in place of the usual "baby show" at the Topsfield Fair, where 90 nutrition conferences were held with the mothers of the children. Two such conferences were held in Boston, at the New England Drug Show, to replace the usual "baby show," a total of 40 conferences on child nutrition being held with the mothers.

Following the Well Child Conference in Seekonk, at the request of the local public health nurse and the Consultant Nurse of the Department for that district, home visits were made by one of the nutritionists to those families whose children showed nutrition defects at the Conference. Twenty-four families were visited in the interest of 33 children. Great value was received from these home visits and future recommendations will be much tempered by the understanding of the homes from which these children come.

(*d*) *Chadwick Clinics:*

The Division of Tuberculosis, through Dr. Zacks, sent out a questionnaire to nurses, at the suggestion of the Consultant in Nutrition, with regard to the value of nutrition service at the Chadwick Clinics. From 171 unsigned returns it was evident that the nurses felt that the work of the nutritionist on the Chadwick Clinic was of great value and importance.

Needy cases reported from the Chadwick Clinics have been a problem for the nutritionists to solve. Such cases cannot be cared for by local welfare departments unless they are actually on relief. An attempt was made to have them followed up by the State District Health Officers, and the plan at the close of the year was to have them followed up through local organizations.

(*e*) *Summer Camps:*

A new departure this year was the plan whereby the nutritionist spent several days at the summer camps rather than the usual one-day visit of former years. Because of this plan more constructive advice was afforded the camp directors. Parent education follow-up was the point emphasized by the nutritionists in this year's camp work. Reports of all camp visits were sent to the Massachusetts Tuberculosis League for their use. To meet the need for recreation material, at our request the Director and Assistant Director of Physical Education in the State Department of Education prepared such material for the use of the camps. Not all of the recommendations made to the camp directors have been carried out but progress is being made in this direction.

(*f*) *Nutrition Courses:*

1. Fitchburg State Teachers College for Teachers and Nurses
2. University Extension Course for Teachers
3. Courses for Mothers
4. Courses for Nurses in Training

1. Fitchburg State Teachers College:

The Consultant in Nutrition cooperated with the State Department of Education during the summer by giving two lectures in the course for home economics teachers and nurses.

One of the nutritionists conducted a ten-lesson course on "Methods of Teaching" and "Nutrition" for Practical Arts teachers; also a course of five lessons on "Newer

Developments in Nutrition" for Home Economics teachers, and a course of four lessons for nurses, on "Nutrition Backgrounds" and "Methods of Teaching."

2. *University Extension Courses for Teachers:*

A nutritionist participated in a University Extension Course for teachers, in the Great Barrington district, giving two lectures on "Backgrounds in Nutrition" and "Nutrition and the School Child."

3. *Courses for Mothers:*

For the mothers at the Florence Crittenton League a series of six lessons was given on "Feeding the Small Child", combined with a cooking demonstration. In Worcester County, for the Mothers' Classes, a lesson in budgeting the family income was given as a part of the course of lectures. For the mothers on Martha's Vineyard Island a series of three talks was arranged for each town on the Island. A total attendance of 140 mothers listened with interest to talks on unusual economies, marketing hints, low-cost meal planning, sweets for the children, school lunches, foods for good teeth, and feeding the fussy, finicky child.

4. *Courses for Nurses in Training.*

In the courses planned for the hospital training schools for nurses, seven talks on "The Nutritionist in Public Health" were given, reaching 137 nurses in training.

(*g*) *Group Talks:*

One nutritionist on the staff gave a total of 120 talks during the year, reaching over 3,800 people. "Feeding the Preschool Child" and "The Food Budget" were given before the Amherst Mothers' Club and the Cohasset Mothers' Club, respectively. In Lincoln and Rehoboth two talks were given to children in grades five to nine inclusive, on "The School Lunch", reaching about 275 children. "The Melrose Plan", "School Lunch Survey", "Foods for Summer", "Safe Dieting", and "Nutrition Follow-up of Well Child Conferences" were given by one nutritionist, reaching approximately 395 people.

(*h*) *Consumers' Council:*

We cooperated with the Middlesex Consumers' Council and others in their efforts to protect the consumer and encourage better education in the matter of selection and purchase of goods, lending advice and assistance on several occasions.

(*i*) *Food Customs from Abroad:*

A need was felt for some publication on adequate nutrition for the foreign born in the State, and this was met by the printing of "Food Customs from Abroad." In this publication are "Good Points" and "Points to be Encouraged" relating to food habits of the seven nationalities existing in greatest numbers in this State. The nutritionist under the Red Cross in the City of Newton assisted in the preparation of this pamphlet. The cover design was a contribution of one of the Civil Works Service artists assigned for work in the Department early in the year. The Federal Emergency Relief Administration requested copies of this pamphlet for distribution to the Nutrition Advisors of the forty-eight states, and in the State of Michigan through the efforts of Miss Leila McGuire, an authority on foreign diets herself, portions of the pamphlet have been mimeographed for the use of the welfare workers there. In Massachusetts it is being used by the Division of Adult Alien Education in the State Department of Education, by nutritionists and home economics teachers, and also by social workers.

(*j*) *Dental Nutrition Studies:*

This is the third year for the dental-nutrition study in the State sanatoria for tuberculosis. Occasional visits were made by the nutritionist to Westfield State Sanatorium to check the meals served and the progress of the addition of tomato juice to the food. Tomato juice was added to the evening meal for the girls and in the fall vitamins A and D were added in the form of haliver oil and cod liver oil capsules daily.

Three new community demonstrations along this line were carried on during the year. The one in Reading was under the direction of the school nurse, the selection of nutrition cases being made by local dentists, the home contacts being made by a nutritionist. Similar plans were started in Orange and Wellesley but through local nutritionists.

Plans for the nutrition aspect of the dental-nutrition program in local communities were made with two objectives in mind—(1) remedial service for children found to have dental defects due to malnutrition, and (2) preventive nutrition education work.

The dental-nutrition study has been stressed as most important in the health of both children and adults, in every Charm School program, in the preschool nursery centers under the Federal Emergency Relief Administration, in courses for mothers, teachers, and nurses, and in all contacts made throughout the year by the members of the Division staff. The subject has been incorporated into our "Protect Your Smile" exhibit also, which carries the message simply and forcibly to an audience.

(*k*) *Other Nutrition Studies:*

In Baldwinsville, at the request of the Director of the Hospital Cottages for Children, suggestions were made to help with their nutrition problem. As a result of our report, a trained dietitian has been employed to supervise the planning and serving of food for the children.

At the request of the Governor's office, to determine the qualifications of those responsible for the planning and serving of meals, a questionnaire was sent to fifty-two state institutions. In 32 of these, dietitians assist, though many of them do not meet the requirements of the American Dietetic Association. This would indicate the necessity of interesting State institutions in Massachusetts in securing well-trained dietitians to be responsible for such an important duty as the selection of adequate food and serving of meals for those in the institutions.

(*l*) *Federal Emergency Relief and Public Welfare Food Plans:*

Since a large proportion of the time of the Consultant in Nutrition and her assistants was spent in the preparation of material for, and assistance in, the projects approved by the Federal Emergency Relief Administration, such activities are being reported as a separate activity in a later section of this report. The Nutrition Consultant was chosen as State Nutrition Supervisor for all Federal Emergency Relief Administration nutrition projects and was asked to pass approval upon all such projects as they are planned.

Of all the struggles of the year, from the point of view of the nutritionists of the Division, the most exciting proved to be that of planning and producing the pamphlet "Your Guide for Buying, Preparing and Serving Good Meals at Low Cost," for use with families receiving welfare aid, and for those with lean pocketbooks. This guide was based on the budget leaflet issued previously, with necessary changes to meet the needs of the families most concerned, and it was printed and ready for distribution before the close of the year.

In Great Barrington, at the request of the local agent of the Board of Public Welfare, a nutritionist visited that community to assist in revising the system of welfare food relief and to aid in the adoption of the so-called Melrose Plan by the town. A meeting of the local grocers was called and the plan presented for their consideration, and it was put into practice early in February. At the end of the year we find it being used only in part since most of the cases on relief are now requiring only supplementary aid.

In the City of Boston material assistance was given to the Department of Public Welfare in the preparation of their budget as it relates to those on relief. A similar type of consultant service has been given in other communities.

The "Melrose Public Welfare Plan of Food Relief" which the Department printed, is being used in Arlington and Great Barrington, as well as in Oneonta, New York.

The Nutrition Consultant was chosen as delegate for social work for the study group of the State Conference of Social Work. This gave her an opportunity to discuss common problems of nutritionists and social workers.

(*m*) *Better Nutrition Picture:*

This year, for the first time since 1929, there seem to be indications that the steady increase in malnutrition and causes of malnutrition among the children have been checked. This has been seen in our Well Child Conferences and in the Chadwick Clinics. The Chadwick Clinic figures showed a steady increase in the number of children not following recommendations because of economic conditions from 8 per cent in 1929 to 34 per cent in 1932–1933, with a decrease to 31 per cent in 1933–1934. A similar picture appears in the Well Child Conference reports of malnourished children.

More breakfasts for children, more noonday meals for children, more adequate allowances by local welfare departments, and more employment are all probable factors affecting this curb. Our dental-nutrition programs, our Well Child Conferences and our Chadwick Clinics have all contributed to this better picture.

It is a pleasure to quote from the report of the Consultant in Nutrition, Miss Mary Spalding, with regard to the nutritionists under her direct supervision, as follows: "In my opinion the nutritionists of the Department have been able to adapt their work quickly to varying types of practical demonstrations in communities, and they have also shown generous team-play."

5. Dental Hygiene:

(*a*) *Dental-Nutrition Program:*

Progress has been made this year in the plan for community dental-nutrition programs. It is felt that in the future we may well consider every case of active decay as in need of nutritional follow-up, but at present the problem is so extensive that we are beginning, as we did with school dentistry ten years ago, with the "worst cases."

A new step was taken along this line in Wellesley where they were fortunate enough to have a nutritionist available and interested; also in Reading where we assisted the school nurse in carrying out a complete program. In both communities the school dentists were sufficiently interested to plan for a complete mouth examination for the cases "screened" by the inspection, and for subsequent re-examinations to determine the presence of fewer new cavities or secondary dentine.

(*b*) *Dental Studies:*

Studies of the dental program were made in Southern Berkshire District to determine what has been accomplished through the dental clinic and dental hygienist; also in the Nashoba area, to find out the needs in the way of a dental program; and in Barnstable County for the purpose of presenting the dental picture of the district to the County Health Bureau.

In the Southern Berkshire District the full-time dental hygienist gave preschool and school inspections and carried on the general educational program and administrative work connected with the traveling dental clinic and local dental clinic service. In school work she spent 42 per cent of her time; in clinic organization and assistance, 29 per cent; and in the preschool program, 13 per cent, the balance of the time spent on office records, reports, etc.

In the Nashoba area 17 per cent of the school children received dental certificates for completed dental work. No information is available for the preschool age group.

(*c*) *Dental Certificates:*

The number of communities reporting dental certificate cases is lower than last year because we purposely refrained from intensive follow-up of late reports. The number of reports received by September, without follow-up (173 in 1933, and 209 in 1934), showed such a good increase that we have sufficient evidence that the program is growing.

We reported towns showing the greatest improvement for the first time this year in the "Bulletin of School Dental Workers"; 36 showed a 10 per cent or more increase over their 1933 records. A study of the 199 towns sending in complete reports for 1933 and 1934 shows an increase in the number of children receiving certificates in 107, or 54 per cent of the towns reporting both years.

	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34
Number of cities and towns reporting	78	126	178	226	243	299	261
Elementary school membership for Mass. (grades 1–8)	535,551	533,545	529,764	530,818	525,853	542,108	518,227
Dental Certificates awarded by:							
School dentist	Not reported separately	Not rep.	Not rep.	14,839	25,431	28,679	29,117
Clinic dentist		23,052	45,989	51,624	64,106	68,901	78,898
Family dentist		27,296	44,774	64,052	38,260	48,474	41,688
Total number of children receiving certificates	25,949	50,348	90,763	130,515	127,797	146,054	149,703
Percentage of elementary school population receiving certificates	5%	9%	17%	25%	24%	27%	29%

(*d*) *Preschool Dental Clinics:*

Pittsfield and Quincy established dental clinics for preschool children. The Pittsfield clinic represents unusually good community organization, the cooperating agencies including the local Dental Society, the Junior League, the Board of Health, and welfare agencies.

(*e*) *School Dental Clinics:*

Reports of activities of the school dental clinics throughout the State were received from 48 per cent of those in operation. The following figures summarize the splendid service rendered to under-privileged children in the communities served:

65,291 children received dental care
51,548 children had dental work completed
290,952 operations were performed
71,952 cleanings were done
121,189 fillings were done
95,171 teeth were extracted

A study of the individual reports revealed that the number of tooth extractions is decreasing in some of the clinics and more children were cared for with no increase in time required—both results that we have expected to get from our preventive policy which the clinics adopted.

In Medford, Framingham and Westport dental clinics were re-established during the year.

Eleven new traveling dental clinics were established during the year in the following communities: Essex, Hamilton, Millville, Peru, Plympton, Provincetown, Raynham, Washington, Wenham, Windsor and West Bridgewater. In Millville the keeping of adequate records helped to arouse the interest of the people locally and the dental program was stressed in the schools through poster-making, drawings, a moving picture on dental hygiene, and classroom demonstrations on the care of the teeth. A complete list of traveling dental clinics in operation during the year follows:

Hampshire County
- Belchertown
- Blandford
- Chester
- Chesterfield
- Cummington
- Dana
- Enfield
- Goshen
- Granby
- Greenwich
- Hadley
- Hatfield
- Hinsdale
- Middlefield
- Millville
- Montgomery

Hampshire County
- Pelham
- Peru
- Russell
- Southampton
- Washington
- Westhampton
- Williamsburg
- Windsor
- Worthington

Franklin County
- Ashfield
- Bernardston
- Charlemont
- Colrain
- Conway

Franklin County
- Deerfield
- Erving
- Gill
- Hawley
- Heath
- Leyden
- Leverett
- Monroe
- New Salem
- Plainfield
- Rowe
- Shutesbury
- Warwick
- Wendell
- Whately

Barnstable County
Provincetown
Truro
Wellfleet

Worcester County
Auburn
Charlton
Petersham
Princeton
Rutland
Westminster

Southern Berkshire
Agawam
Becket
Essex
Hamilton
Monterey
New Marlboro
Otis
Raynham
Richmond
Sandisfield
Sheffield

Southern Berkshire
Tyringham
Wenham
West Bridgewater
West Stockbridge

Plymouth County
Plympton

(*f*) *"Protect Your Smile":*

The "Protect Your Smile" program for 4-H Clubs is the most interesting new project for the year. The idea and slogan suggested by the Department were developed into a Club program with the leaders at Amherst State Teachers' College, and enlarged to include dentists through the cooperation of the Massachusetts Dental Society. The plan is to teach 4-H Club members to protect their smiles through good nutrition, daily care and dental care. A booklet of source material for leaders was prepared by the Department and distributed through the State Club Leader.

"The thing that will count more than anything else" (quoting Mr. Eastman, a County Club Agent) is the plan for free dental consultations that has been the contribution of the Committee on Public Relations of the Massachusetts Dental Society. This Committee sent a letter to all dentists exclusive of those in the larger cities, approximately 1,000 being included, asking them to take part in the program by "granting each 4-H Club member in his community an appointment for consultation, examination and advice as to personal care and needed dentistry."

(*g*) *Well Child Conference Program:*

The Dental Hygiene Consultant spent a great deal of time during the year with the demonstration Well Child Conference unit of the Division. The Unit visited 26 towns, 4 for the first time and 22 towns for a return visit. It is in these Conferences that we have had an opportunity to study conditions "Not from the hub but from the rim of the wheel."

The nutritionists of the Unit give special help to every mother whose child is reported to have any evident dental caries. The Well Child Conferences also afforded opportunity to consult with the local public health nurses regarding school dental programs. From these Conferences we have been able to secure better returns of dental certificate reports, notably higher in the western part of the State where the majority of Conferences were held during the past year.

(*h*) *General:*

Looking back over the year, we found that dental health education and dental clinic service developed most rapidly in the rural sections of the State; the school dental program reached out to include the smaller children through the Well Child Conferences, and to the adolescent group through the 4-H Clubs; evidence of a slow, steady growth in all phases of dental hygiene, closer cooperation with outside organizations, and a strong tendency to preserve the patient-family-dentist relationship.

The dental hygiene service in Southern Berkshire Health District, in the establishment of which we assisted two years ago, is still the outstanding example of a generalized program for a dental hygienist. A total of 52 dental hygienists were employed locally throughout the State, serving 50 communities.

6. Health Education:

(*a*) *In the Schools:*

The Health Education Worker has kept in contact with the High School Health Councils which are still functioning in Norwood and in Yarmouth. In the section on Health Education in Secondary Schools there is a detailed report of the communities where the Health Education Worker of the Department cooperated, namely: Amherst, Athol, Charlemont, Chelmsford, Greenfield, Rockport, Shelburne Falls, Westford, Williamsburg and Winchester.

(*b*) *Outside the Schools:*

4-H Clubs were contacted in twelve communities when older members in the service clubs requested some form of health education instruction. Charm Schools were carried on in six towns with their usual interest and success. Considerable time was spent in the organization and explanation of the "Protect Your Smile" program.

A series of four talks was planned for a group of unemployed girls coming to the Lowell Tuberculosis Association. Two of these talks were given by the Health Education Worker and the other two by a nutritionist of the Department.

At the East Boston Social Center four talks were given to a group of girls and a Charm School was held at the vacation school during the summer.

Through single talks 22 other organizations were contacted and some phase of the health education program stressed. These included a commencement program and a summer Sunday school group.

(*c*) *Publicity:*

The Health Education Worker spent considerable time in consultation with visiting nursing associations concerning the development of detailed local publicity programs, including suggestions for campaigns for funds, window displays and annual reports.

Forty-seven newspaper releases were prepared and sent out for Well Child Conferences or for diphtheria immunization campaigns; three state-wide newspaper releases were issued, and five local communities were given assistance in the preparation of publicity publications. Much time was spent in the discussion of preparation of annual reports with representatives of local visiting nursing organizations and "Suggestions for Writing Annual Reports" was prepared and distributed at the annual meeting of the Massachusetts Organization for Public Health Nursing.

Six lectures were given on "Publicity in the Public Health Program."

(*d*) *Exhibits, Posters, Pamphlets:*

The Health Education Worker helped to plan twenty-eight separate exhibits and was in attendance upon twenty-two of these. A series of monthly exhibits was worked out for the Walpole Visiting Nurse Association as a part of its publicity plan.

The Department exhibits were displayed in Boston, at the Drug Show; at the Young Women's Christian Association; and a special exhibit on dental hygiene at the Massachusetts Dental Society annual meeting—this exhibit being sent later to St. Paul, Minnesota, for the annual meeting of the American Dental Association; for visiting nursing associations in Holyoke, Lexington, Pepperell, Scituate and Walpole; at Swampscott for the annual meeting of the State Federation of Women's Clubs; at the New England Health Education Association meeting and the annual meeting of the Massachusetts Organization for Public Health Nursing; at the Eastern States Exposition; in Medford for the Boy Scouts; in twelve towns in the Southern Berkshire district; at Martha's Vineyard Fair; and in Somerville. In the two latter communities a series of exhibits were used with Mothers' groups. At Framingham and Fitchburg State Teachers Colleges a number of exhibits were used with teachers in training and teachers in service. The School Lunch exhibit was used by one of the nutritionists at Haverhill, Carlisle, Lenox, Otis, Sandisfield, Seekonk, Tyringham, West Springfield, and Westport. Exhibits were used also at 33 Well Child Conferences.

The activities of the Health Education Worker-Artist this year were confined chiefly to the making of posters, charts, graphs, etc., a total of 232 being completed during the year, 52 of which were for Divisions of the Department other than Child Hygiene. Some of these were prepared for the health days and exhibits at Chester, Plymouth and Sheffield, and for the annual meeting of the Massachusetts Medical Society in Worcester; for Eastern States Exposition, Springfield; State Nurses'

Association meeting in Boston; and the towns in the western district of the State for their annual health days under the direction of Dr. Miner, State District Health Officer.

Because of the press of work incident to the above needs, very little time of this worker was devoted to the program of correlating art work in the schools with health subjects, through poster-making, etc. Only 4 public schools were visited and 22 parochial schools, regarding this program during the year, the former in Provincetown, Truro and Wellfleet, and the latter in the Brighton, Charlestown and East Boston sections of Boston proper, and in Cambridge and Lowell. Slogan sheets for health poster-making were requested by parochial schools to the number of 23,700, and by public schools, a total of 2,000. Concerning this program 39 school officials were visited, 36 in parochial schools and 3 in public schools. Following these visits printed material for school use was ordered from the Department to the number of 346,317 pieces as compared with 780,586 pieces ordered in 1933—a decrease of 56 per cent due to the inability of the Health Education Worker to cover this field because of necessary art work for the Department.

Printed material distributed during the year totalled as follows:

	Pieces
Child Health Day material	117,021
Summer Round-Up material	84,673
Other publications	804,600
	1,006,294

The demand for printed material has been constant throughout the year and there have been more requests along various lines than previously. Ten new reprints of articles written by members of the Department staff were received for distribution during the year.

The following pamphlets were reprinted with little change in their content:

Attention! Stand Tall
A Child Entering School Should Know
Care of the Child in Cold Weather
Care of the Child in Hot Weather
Dental Certificates
Dental Honor Roll
Foodways to Health
How to Judge Nutrition of Children
Keeping Well
Normal Gain in Height and Weight
Notification of Dental Defects
Registration Chart—Mothers' Classes
Supplies Necessary at Time of Confinement
Ten Rules for Healthful Living
The Strategical Position of the Classroom Teacher.

Revision was necessary during the year to bring the following publications up to date: The Baby and You; One to Six; School Hygiene Handbook; For Your Teeth and Gums; Your Baby's First Teeth; Your Second Teeth; Suggestions for Care During Pregnancy; Aids to Bowel Movement; Diet for Children from Birth to Two Years; and the Well Child Conference Record Form.

New Department publications issued during the year include the following: a Circulation of Publications form; Daily and Monthly Report of School Physician; Food Customs from Abroad; Your Guide for Buying, Preparing and Serving Good Meals at Low Cost; and One Week's Grocery Orders.

It is of interest to note the increased demand for our pamphlets created at health shows, county fairs and annual meetings of the various organizations. Two and one-half times as many orders for printed material were received from these sources as were received the previous year.

From other states we received 710 requests for printed material. Many requested the new pamphlet Food Customs from Abroad, which seems to meet a great need, and which was given notice in the "Journal of the American Dietetic Association" in the fall. Out-of-state requests came from the following states, through the exhibition at Eastern States Exposition at Springfield: Connecticut, New York, Vermont, Rhode Island, New Hampshire, Kentucky, Georgia, Florida and New Jersey, a total of 185 from all.

From other countries there were received requests for our printed material during the year, as follows: Canada, England, China, Hungary, Australia, South America, Czechoslovakia, India, Ireland, Italy, Mexico, Puerto Rico, South Africa, Spain, Switzerland, Syria, United States Soviet Russia and the Island of Hawaii.

Four special issues of "The Commonhealth" were devoted to The Handicapped, Adult Hygiene, Diabetes, and Health Education. The demand for these special numbers and the inclusion of so many important papers on timely subjects has almost doubled the work of preparing the material for printing and distribution.

(*e*) *Library:*

The Library Committee met several times during the year for the consideration of purchase of new books and subscriptions and regulations for the use of the library. The library work has been unusually heavy, due to the increase in accessions and a greater demand for reference material from members of the Department staff, the cataloguing of material not previously listed, as well as new books, and the circulation of journals and printed matter throughout the staff.

(*f*) *Lectures, Motion Pictures, etc.*

There were given during the year 952 lectures and 138 radio broadcasts. This service was given in 164 communities of the State, and 5 talks were given outside the State, one by a public health nursing consultant who addressed the Rhode Island State Nurses' Association. Aside from radio listeners, 48,845 persons were reached with the lecture service afforded by the Department.

Motion pictures were loaned to 99 communities and delineascope filmslides loaned to 35 communities of the State.

Department posters were used in 58 communities and the animal and nutrition posters were issued for permanent use to several communities. Through a Civil Works Administration Project, 11 artists were assigned to make posters and murals for exhibit backgrounds for the Department. Some of these have been in almost constant use throughout the year.

Exhibits were loaned to 83 communities, 25 of these in connection with the Well Child Conferences conducted by the Division staff.

(*g*) *Prenatal and Postnatal Letters and Fathers' Letter:*

At the close of the year there were on the registry for the monthly letter service to prospective mothers and to mothers of children under two years of age 27,431 names, as compared with 23,000 recorded during the previous year. New requests for prenatal letters in 1934 totalled to 7,654, as compared with 6,100 for the year 1933; for the first year postnatal letters to 7,157 for 1934, as compared with 6,200 in 1933. The letter to fathers was sent to all families requesting prenatal letters, a total of 7,654 during the year.

II. SPECIAL PROJECTS

1. Federal Emergency Relief Administration
Civil Works Administration
Civil Works Service.

Early in the year a great deal of the time of the Chief Consultant in Public Health Nursing was spent in preparation for possible Civil Works Projects that might be approved for this State for the employment of nurses, physicians, etc. Questionnaires were sent out for information from unemployed nurses and nearly one thousand replies were received. This information is classified and on file in the Division. However, no projects were approved.

Under the Federal Emergency Relief Administration projects for the conduct of Preschool Centers were approved, and these were placed under the supervision of the State Department of Education. At the request of the Department of Education the staff of the Division of Child Hygiene was called upon frequently for advice and assistance. Special meetings were arranged for the workers in the Preschool Centers in Boston, Greenfield and Taunton. These meetings were conducted by the nutritionist of the Department of Public Health, and in addition to general talks to the workers, special talks on nutrition were given to the mothers of the children in attendance.

Early in the year the State Department of Education requested assistance from the nutritionists to work with 36 nutrition teachers appointed to the Preschool Centers by the Federal Emergency Relief Administration. These teachers met in Institutes and in small groups for the discussion of their problems, in Boston, Northampton and Springfield. They were given advice and assistance with individual case problems and provided with printed material for their use in feeding small children and in teaching good health habits, as well as for their parents' classes. Decided improvement in the children's eating habits was observed through these projects.

Again we cooperated with the Emergency Relief Administration by passing opinion upon food budgets, at their request, taking into consideration the make-up of the families as to age, sex and activity. The Consultant in Nutrition was also asked to pass upon local work projects in nutrition as they are granted by the Emergency Relief Administration.

In local work projects, when 28 nutritionists and visiting housekeepers were appointed under the Emergency Relief Administration in Brockton, Fitchburg, Franklin County, Methuen, Pittsfield and Worcester, we advised with them regarding their work plans and provided printed material for their use. Through these workers those in financial straits were assisted in getting the best returns for their food money and welfare recipients were aided also in this respect. The head of the Women's Division in Worcester reported that because of our advice and assistance their nutritionists have been able to keep down the expenses as well as to maintain the health of those referred to them from both health and welfare departments.

In the northeastern section of the State, Preschool Centers were established in Amesbury, Hamilton, Haverhill, Ipswich, Maynard, Melrose, Natick, Newburyport, Newton, Rockport, Reading, Salem and Wenham, in all of which communities the nursing consultant for the district assisted the local nurses with the problems arising through these activities.

In Chicopee, special interest was focused upon the Preschool Centers established under Federal Emergency Relief Administration. Dr. Susan Coffin, Pediatrician of the Division, for preschool activities, was asked to assist with the physical examinations of the children of preschool age attending these centers. Following the examinations a conference was held with the dental hygienist, nutritionist and nurses in attendance upon the Preschool Centers, relative to coordinated plans for the correction of defects found, through stimulation of the parents themselves, the provision of funds, and other resources in the community. Efforts were made to stimulate the organization of a more representative visiting nursing association. There has been some growth noted during the year. In December a new group of 64 children were examined in the Chicopee Preschool Centers.

Under the Civil Works Administration the eleven artists assigned to the Department executed posters on Nutrition, School Hygiene, Child Hygiene, Infant Hygiene, and educational murals for use in Preschool Centers as exhibit backgrounds and wall decoration.

Under the Civil Works Service two statistical clerks and three typist-clerks were assigned to the Department for a short time, to assist in special studies.

From the Transient Camps early in the year came requests for advice and assistance, and ration lists and menus were planned by one of the nutritionists. A nutritionist visited each camp and transient shelter to sample the meals served and confer with the mess officers. Many of the suggestions made have since been carried out in these camps and shelters.

The State Department of Public Welfare has conferred with the Department nutritionists frequently with regard to revision of their calorie card for welfare visitors, in order to provide adequate allowance for babies and a less expensive allowance for adolescents. Because of this the allowance for families with "teen age" children and families with small children will be better adjusted.

This year we are glad to report the endorsement of the State Department of Public Welfare for our pamphlet, "Your Guide for Buying, Preparing and Serving Good Meals at Low Cost." This material was planned directly as an educational aid to county and city welfare recipients and indirectly to welfare representatives, nurses, nutritionists, as well as the nutritionists of this Department for use in their contacts. Four community nutritionists, as well as the nutritionists of the Department, gave practical advice and assistance in the preparation of this material. It is hoped, through these plans for food at low cost, that more communities may raise their standards to meet its adequacy, as the period of emergency rations must not be carried on too long. Up to the present time large families have been the ones to suffer most.

2. Staff Education:

All the consultant nurses of the Division attended a week's course on Home Hygiene and Care of the Sick, given by Miss Helen Dunn of the American Red Cross, at Fitchburg State Teachers' College.

Likewise, all attended the New York University Extension Course on The Psychological Approach to Child Health, led by Helen Hackett, Nursing Consultant for Worcester County District.

III. Personnel of the Division.

We record, with regret, that the illness of Miss Ada Boone Coffey, Chief Consultant in Public Health Nursing for the Department, prevented her return to duty. Miss Coffey was given leave of absence for several months in the hope that she would recover sufficiently to resume her duties, but she was unable to do so at the close of the year.

During the summer, with the reorganization of the Chadwick Clinic program, Miss Catherine Leamy was transferred from the Division of Tuberculosis to the Division of Child Hygiene, as Public Health Nutrition Worker. For the purpose of further study, Miss Leamy was granted leave of absence in October, at which time Miss Helen Inman was appointed as substitute nutritionist for the year.

Miss Mary Whalen resigned her position as junior stenographer, to be married, and Miss Florence Mahoney was appointed as her successor.

Massachusetts Statistics for 1934

Population (Estimated as of July 1, 1934	4,339,210
Death rate per 1,000 population	11.7
Infant mortality (per 1,000 live births)	49.2

REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

Gaylord W. Anderson, M.D., *Director*
N. A. Nelson, M.D., *Assistant Director*
John J. Poutas, M.D., *Assistant Director*

General Statement

Of recent years it has become fashionable among epidemiologists to speculate about an irreducible minimum for typhoid fever and diphtheria. During the past year the decline in these two diseases has been so striking as to raise serious questions as to the soundness of the doctrine of irreducible minimum. Both of these diseases have now reached a level lower than our fondest hopes several years ago could have foreseen and the end is not yet in sight. Elsewhere in the field of communicable disease, as shown by our experience during the past year, progress has been less striking. In some instances the improvements have been due to increasing good management through public health education; in other instances the favorable results have been due solely to good fortune.

Prevalence of Special Diseases

Anterior Poliomyelitis. The past year has seen this disease at the third lowest level that Massachusetts has experienced since the disease was made reportable, only 1932 and 1919 having reached a lower level. The number of deaths, however, was lower than in 1932 and 1919, thus establishing a new record. This probably does not mean, however, that the disease was any milder, but is due to the fact that in the first few months of 1932 there were several deaths of victims of the 1931 epidemic whose ultimate demise had been delayed.

Although the past year has seen an outbreak of considerable proportions in California, there was at no time any evidence that the disease was going to spread across the country in epidemic proportions into New England. Along the northern tier of states through the midwest there was, however, a definitely higher incidence than was experienced in New England. This slight wave came eastward, being felt as far east as New York. Whether or not its absence in New England was due to the fact that it arrived too late to manifest itself as recognizable, infantile paralysis can only be surmised. In support of such a theory is the fact that in the southern half of Worcester County, of seven cases that occurred during the year, six were during October and November. Likewise, the Lawrence area was free until October, when three cases appeared. What may be the significance of this as affecting next year's experience is entirely problematical. It seems unlikely, however, that we can expect another year at so low a level.

With the low incidence of the disease, the supply of convalescent serum which was on hand at the end of 1933 was sufficient for the current needs, thus obviating the necessity of additional bleeding clinics. All of the serum was re-filtered and redistributed to selected hospitals on the same plan as during the two preceding years. One or two hospitals were dropped from the distributing list as they were apparently superfluous and might be discontinued without impairing the availability of serum in their locality. Consultants of the Department saw 36 cases in consultation with physicians.

Diphtheria. Diphtheria furnished the most striking reduction in the field of communicable diseases, the number of cases falling to 629 as contrasted with 1,041 for last year. At the same time the deaths fell to 50 as contrasted with 86. This means a reduction of 40 per cent in cases and 42 per cent in deaths. Thus the current incidence of the disease is barely one-fifteenth the incidence in 1923, when diphtheria immunization began on a large scale in Massachusetts. Even more encouraging than this actual reduction is the thought that there is no evidence as yet of reaching a stationary so-called irreducible minimum. The year closes with diphtheria constantly declining, as compared with its incidence in corresponding months in previous years, so that we have reason for anticipating that 1935 will show a substantial reduction under the low 1934 figures.

In the midst of these encouraging reports it is disheartening to record that there are still certain communities where diphtheria continues at a disgracefully high level. Lowell presents the spectacle of a community which conducted at one time the most extensive and active immunization program ever held in Massachusetts. The work was then allowed to lapse, 1932 showing a substantial increase of diphtheria over the low figures of 1930 and 1931. The year 1933 saw Lowell with the unenviable distinction of the highest diphtheria death rate in any city over 100,000 population in the United States, as well as the highest diphtheria incidence of any large Massachusetts community. For 1934 it again had the highest rate in Massachusetts, and although the figures for other parts of the country are not yet available, it will certainly have an unenviable ranking as the number of deaths increased over the already high 1933 level. Throughout 1933 this Department had repeatedly urged that a more active immunization program be undertaken and had repeatedly made offers of assistance. Finally, during the past summer, the city of Lowell obtained a large sum of money from the Emergency Relief Administration, immunizing a large number of children. The sum expended, however, made it one of the most expensive immunizing programs ever carried on in Massachusetts. This work has already shown its effect in that diphtheria has been materially lessened during the past two months, but too late to save the city from a very discreditable 1934 record. The coming year should see a great improvement. Somerville presents an even sadder picture from the point of view of the protection of its children, the Board of Health having failed to carry on any immunization work since 1931. Although fortune has smiled more kindly, sparing the city as extensive an outbreak as occurred in Lowell, the record for the year shows diphtheria at a figure markedly above that which has been attained by comparable cities that are making use of modern public health practices. Only during the closing months of the year has any local plan been evolved for the conduct of this work, and it is questionable whether such a plan can be definitely pursued. The cities of Somerville and Lowell together will have contributed almost one-half of all the diphtheria deaths in the State and in each city the number of deaths has increased over the 1933 level. Another community which is outstanding in its neglect of diphtheria immunization is Haverhill, where through good fortune diphtheria has been surprisingly low, in spite of a large susceptible population. Experience shows, however, that such a remarkable freedom from the disease cannot be maintained, so that unless active work is begun the city is merely postponing the evil day.

There are still a few communities that have completely failed to ever provide for any such immunization work. The towns of Charlton and Sutton furnish outstanding examples, both of which felt that because of a freedom from diphtheria for ten years there was no need for active immunization work. Within two months during the fall Charlton experienced 10 cases and one death and Sutton 15 cases and one death. In the former community nothing has yet been done to avert repetition of this tragedy. Sutton, however, with the assistance of the Department, instituted an immunization program which in reaching a high proportion of the children has never been surpassed. This will prevent a repetition of the tragedy but cannot bring the victims back to life. There are still, however, a number of communities that have failed to take any action. These communities are Berlin, Charlton, Cohasset, Florida, Hubbardston, Hull, Marblehead, Marshfield, Mendon, Millville, North Brookfield, Pelham, Phillipston and Savoy. The Department has repeatedly urged such action upon all of these and it is possible that some of them may undertake such work during the forthcoming year. The others prefer to ignore their responsibilities and unfortunately, the children, who are the potential victims, have no choice in this matter. And yet we adults speak with condescension of the baby whose intelligence is so poorly developed that it must burn its fingers before learning that the stove is hot.

During the year a number of communities have obtained funds for diphtheria immunization through the Emergency Relief Administration. It is possible that such practice is to some extent a two-edged sword. Undoubtedly, such funds if properly expended will definitely contribute to the promotion of diphtheria immunization. On the other hand, unless they are used with considerable discrimination there is a possibility that they may tend to take away from the community that sense of local responsibility, which is essential for the continuation of such work in future years when federal funds for this purpose may not be available. The most worth-while type of a program of this sort was that such as was conducted in Beverly, Peabody and a number of other communities, whereby the federal funds were used to employ nurses to make house-to-house canvasses to interest mothers in diphtheria immunization. Under such a plan the local community took full responsibility for the actual immunization of all children, the State, through this Department, furnishing as usual the material for such immunization. Such a plan would appear to be a very suitable division of financial responsibility. In those communities, as in Lowell, where the entire expense was borne by the ERA, the local community making no contribution, it will be inevitable that difficulty will be experienced in future years in the continuation of this work. Among the communities obtaining ERA assistance for diphtheria work were Beverly, Brockton, Clinton, Fall River, Lowell, Lynn, Newburyport, Peabody and Quincy.

One of the outstanding advances in diphtheria immunization of recent years has been the development of a one-dose method. This is being extensively tried in certain sections of the country, and if the early reports are confirmed, bids well to ultimately supplant all other methods. On the other hand, there have been in the early reports too frequent complications to warrant this Department's hasty adoption of it. Already much work has been done which will prevent such complications so that ultimately it may be that this one-dose toxoid can be extensively recommended. In the meantime, it seems the part of wisdom in a community where such striking progress in diphtheria control is being made to await the perfection of the method rather than to jeopardize the success of the program through risking unfortunate, even though not dangerous, complications.

Dysentery, Amebic. The prediction made in last year's report that the Chicago outbreak of amebic dysentery would not constitute a widespread menace to the country through the development of secondary cases appears to have been justified. During 1934 there have come to light a few additional cases traceable to an infection in Chicago during the summer of 1933, but so far as is known there have been no secondary cases. The attention given to this disease, however, has resulted in a slightly better recognition of the endemic cases that have probably always occurred but have escaped detection, largely because no thought was given to the possibility of this condition. The largest number of cases reported during the year have been from Worcester. This probably does not mean a local epidemic, but is due solely to the fact that the laboratory of one of the hospitals has been making a rather intensive study of all patients. In some of these cases, however, there is reason for suspecting that certain of the patients may have been carriers rather than active cases of the disease.

The diagnostic service, which was set up as an emergency in conjunction with the Department of Tropical Medicine in the Harvard Medical School has been transferred to the Bacteriological Laboratory, which is now prepared to examine specimens both for the vegetative form of the ameba and for cysts. The Chicago outbreak had the effect of prompting the introduction into the Legislature of two bills for compulsory examination of food handlers aimed primarily at the detection of amebic dysentery carriers. Owing to the utter impracticability of these bills and the fact that the money required for the carrying out of such examinations could be spent to far better advantage in some other field of public health, the Department opposed these bills, which were ultimately granted leave to withdraw. There is at present no evidence to indicate that the routine examination of all food handlers for amebic dysentery carriers is a practical or worth-while public health enterprise.

Dysentery, Bacillary. The greatly increased number of cases of bacillary dysentery is due to the occurrence of several institutional outbreaks. The two largest of these were in Northampton State Hospital and the Fernald School for the Feeble-Minded, the number of cases in each instance being indeterminable. In the former, several deaths occurred in previously debilitated patients. The infection has continued at the Danvers State Hospital and three cases appeared in the Belchertown State School, where, however, the condition was recognized promptly and through active precautionary measures an extensive outbreak averted. In all of these instances dysentery bacilli of the Hiss-Y strain were isolated.

Although no figures as to the incidence of bacillary dysentery in the general population are available, there is very strong evidence that the disease occurs much more frequently than is suggested by the morbidity reports. In the healthy young adult an infection with the Hiss-Y strain apparently produces nothing more than a diarrhea of two or three days duration. The disease as seen in institutions is such that this type of patient would rarely consult a physician were he in civil life. There is thus reason for believing that many of the idiopathic diarrheas which may occur from time to time are in reality bacillary dysentery which escapes recognition unless it happens to attack a small child, in whom the classical symptoms are produced. Although the situation may be disturbing, it is apparently of minor consequence, except as it may effect an infant or an elderly debilitated patient.

Encephalitis Lethargica. In last year's report reference was made to the outbreak of encephalitis lethargica that occurred in and around St. Louis, the disease being somewhat different from the type of encephalitis usually encountered. The past year has seen the appearance of sporadic cases both in this State and elsewhere that in their manifestations were strangely suggestive of this St. Louis type. In Massachusetts, however, there has been no evidence of localization.

Epidemic Cerebrospinal Meningitis. Although the reported incidence of this disease was somewhat higher than for last year, the number of deaths reached the second lowest figure ever recorded. This record is probably due more to good fortune than to good management, as there is nothing that can be done in our present state of knowledge to guard against this disease. During the early part of the year several cases appeared which were entirely refractory to the serum produced at the Antitoxin and Vaccine Laboratory, suggesting the possible introduction of a new strain into the State. There has been no evidence during the latter part of the year, however, that any such strain has gained a foothold in Massachusetts.

Gastro-Enteritis. During the past year there has come to the attention of the Department an increasing number of "outbreaks" of gastro-enteritis. Although two or three of these were of an explosive nature definitely associated with food, the majority presented themselves as nothing more than an unusual incidence of gastro-intestinal disturbances in a community within a relatively short period of time. These were the type of cases that are frequently referred to as "intestinal grippe." Although there is no evidence that the etiologic agent is related to the organism that causes the usual type of grippe, there is increasing evidence that there is some sort of gastro-enteritis that is spread through the respiratory tract. It is popular to attribute these incidents to a water supply. Such occurred in Collinsville and Bedford, yet examination of the water showed no evidence of pollution, and the distribution of the cases over a period of one to two months would definitely suggest some other mode of spread. In one instance in a summer camp the epidemiological findings very strongly pointed toward a respiratory spread.

In Fitchburg an extensive and explosive outbreak of gastro-enteritis developed as a result of pollution of the water supply. These cases were all in the northern half of the city and were served by the northern high pressure system. They occurred immediately after a heavy thaw with its attendant run-off and were unquestionably due to pollution of the watershed through CWA workers, who in spite of the warnings of this Department had been permitted to work on the watershed without adequate precautions being taken as to the disposal of excreta. Several thousand persons were involved in this outbreak, which however was of but short duration.

Influenza. As was noted last year, the term influenza has been used to cover such a wide variety of conditions that the disease itself is no longer reportable in Massachusetts, it being felt that the reporting of so indefinite a condition added merely to the confusion. During the year the Department has, however, kept in close touch with the incidence of upper respiratory conditions throughout different sections of the State. This has been effected through weekly reports of absenteeism from certain schools, weekly reports of case load in different visiting nursing associations, and through weekly reports of broncho-pneumonia deaths in certain communities. This gives, apparently, a relatively sensitive index of upper respiratory conditions. During the past year there has been no evidence at any time of any undue prevalence of such conditions which might be included under the heading of either influenza or grippe.

Malaria. Twenty-seven cases were reported, all but one or two of which were in all probability infected outside of Massachusetts.

Measles. The past year has seen the highest incidence of measles ever reported.

The disease began to appear around Worcester during the closing months of 1933, becoming widespread in that city and in all surrounding towns. As the year closed it had appeared in the Metropolitan area and was increasing rapidly, reaching its peak in March of 1934, when almost 10,000 cases were reported. The entire Metropolitan area was involved, spreading outward along the north and south shores. The final result was an epidemic wave that had swept the entire eastern half of the State, exclusive of the Merrimac Valley, and the extreme southeastern corner of the State. The high incidence of measles brought with it a sharp increase in the death rate. On the other hand, there is considerable satisfaction in the thought that the case fatality rate was lower than any previous year, except 1933. This probably means a greater appreciation on the part of the public of the seriousness of measles, with better facilities for the protection and care of small children, among whom the majority of the deaths occur. It does not seem reasonable to attribute this low case fatality rate solely to improved reporting, as there is no evidence that the improvement in the completeness of reporting has been commensurate with the decline in case fatality.

During this epidemic it was possible for Dr. McKhann at the Children's hospital to gather further data as to the efficacy of the placental extract, to which reference was made in last year's report. The results obtained in the prevention or modification of measles among those definitely exposed to the disease were so encouraging as to warrant a more extensive study in future years. A grant has been made by the Commonwealth Fund of New York City for a continuation of this work by Dr. McKhann in conjunction with the Division of Biologic Laboratories. This means that in the near future placental extract will be available for distribution throughout the commonwealth under such conditions as will furnish more complete data as to efficacy, reactions and proper dosage.

Pneumonia, Lobar. The past fifteen years have seen a progressive decline in lobar pneumonia, interrupted periodically by slight recrudescences, followed by a period during which the disease, as measured both by reported cases and by deaths, has been at a lower level than ever previously recorded. The winter of 1933–1934 saw such a pneumonia wave, which, however, ended with the end of the "pneumonia season." Thus the final figures for the year showed the lowest lobar pneumonia death rate ever experienced in this State, 1,601 deaths occurring as compared with the previous record figure of 1,688 in 1933.

Psittacosis. One questionable case of psittacosis appeared in the person of the wife of the proprietor of an aviary. If this was actually psittacosis, it must be concluded that it was contracted from a bird that was a healthy carrier of the disease.

During the year certain changes have been made by the United States Public Health Service with regard to interstate shipment of birds of the psittacine family, these regulations being designed to limit the further spread of the infection from the infected aviaries in California. The result has been a virtual embargo upon shipment of such birds, though toward the end of the year certain of the aviaries have been able to satisfy the necessary requirements for shipment. Time alone will tell how effective these regulations will be. They have, however, definitely upheld the hand of the California State Health Department, enabling them to exercise jurisdiction over the aviaries, which was formerly not possible. In the meantime, however, certain states have prohibited the importation or sale of all such birds, these regulations being defended on the ground that in spite of the precautions ordinarily observed there is apparently a definite illicit trade in such birds. The rareness of the disease and the evidence that the present supervision in California may rectify the situation make it questionable whether or not such drastic measures are necessary. Nine birds were shipped out of Massachusetts during the year, certificates being granted in each instance.

Rabies. The past year has seen a definite increase in the prevalence of rabies throughout the eastern half of the State, 251 positive heads being reported from the laboratory, as compared with 144 for the previous year. These have been very largely in the Metropolitan area, spreading northward into the eastern section of Middlesex County and the western border of Essex County. A small focus developed in the communities to the east of Brockton. During the summer a few cases appeared in the northern part of Worcester County, though this focus seems to have definitely died out. Late in the year the disease began to spread from the southeastern corner of Middlesex County into the southern part of Worcester County so that it is likely that 1935 will see more of the disease in that section of the State. Boston, because of its size, had the largest individual number of cases. Other communities with a particularly unhappy experience were Lexington, Melrose, Quincy, Waltham and Winchester. As the year ends there is a definite active focus in the Somerville–Medford–Malden section as well as another active focus around Lexington.

One human case of rabies developed, the victim being a five year old child from Lynn bitten on the face by a dog that was not located. The whole case was a tragedy of errors, as there were several places in the course of events where steps might have been taken to avert such a tragedy. The case was not officially reported as one of dog bite, nor was antirabic treatment given. In Winthrop a child bitten by a proven rabid dog died of a condition which was at first thought to be rabies but on review was probably an encephalitis associated with the vaccine. This is one of the rare complications which may occur as a result of such treatment. Although it occurs but once in several thousand instances, it constitutes but another reason why more active measures should be exercised to control the spread of rabies among the dogs and thereby avoid the necessity of subjecting persons to the necessary inoculations.

During the past year there has been manifest an increasing interest in the possibilities of rabies control through dog inoculations. Evidence is accumulating in this State that the annual one dose injection method confers a protection for a period of a year, which is quite comparable to that conferred in the human against diphtheria through toxin-antitoxin injections. In other words, the bulk of those so treated are actually protected, even though an occasional failure may be recorded. Such work has been carried on in previous years in several communities including Belmont, Billerica, Framingham, Natick, Newton, Watertown and Wellesley. During the past year such work was begun in a number of other communities including Brookline, Concord, Lowell, Melrose, Middleton, Milton, Saugus, Swampscott, Waltham and Winthrop. In some of these communities the conduct of a dog inoculation clinic has been coordinated with a restraint order, which has provided for exemption of those dogs recently vaccinated. This is probably the most effective type of restraint order, as the ordinary ninety-day restraint is so irksome to the dog owners as to be marked more by its violation than by its observance. There has been some agitation in favor of compulsory inoculation of all dogs. Whether or not such is ever desirable, it seems clear that the time for this has not as yet arrived. Far better than a compulsory inoculation, however, would be a provision for free inoculation of dogs as a partial return for the license fee. Such a provision would reach a substantial proportion of the licensed dogs and would make unnecessary any consideration of compulsion. When more definite data as to the effectiveness of such inoculations are available, it would probably be advisable to attempt to obtain the necessary legislation to make available free inoculation in return for the license fee.

The 1934 Legislature completed an elaborate revision of the dog laws, certain parts of which should very definitely contribute to the further control of the stray unlicensed animal and thus indirectly contribute towards rabies control. In addition the law, which at present requires a board of health to furnish free of charge antirabic vaccine for the treatment of those persons as to whom this Department recommends such treatment, was amended to provide further that expenses of giving such treatment should be borne by the board of health. The city and town will be reimbursed by the county for cost of both vaccine and treatment to a sum not to exceed $50 per individual case. This addition to the law will meet a long-felt want. The 1932 law furnishing the vaccine free of charge went a long way to rectify a bad situation, as the cost of antirabic vaccine was often an overwhelming burden upon a family. This new provision for the cost of the treatment eliminates the last part of the financial burden. It is also of considerable benefit to the medical profession, as in many instances the physician was in the position of having cared for several members of a family bitten by or exposed to a dog without receiving any remuneration whatsoever for his services. The law has also empowered the counties to enter into contracts for vaccine to be furnished to their respective cities and towns. This does not prevent any town from purchasing vaccine from any independent source, but it does limit their reimbursement to the cost obtainable through such a contract. This provision was greatly needed to eliminate the confusion that was resulting under the old system, whereby the community bought the vaccine at whatever price it could obtain it and was reimbursed by the county for this cost. Under this system there was the widest diversity of prices, the system also being open to the possibility of considerable abuse. This law, which becomes effective January 1st, 1935, will be of definite assistance in future rabies control.

Scarlet Fever. Scarlet fever, with only 8,391 cases reported, reached the lowest recorded level since 1922. At the same time the deaths fell to about 76, the second lowest number ever recorded for scarlet fever. The explanation for this surprisingly low figure is to be found in the fact that during the past three years scarlet fever has rather thoroughly "burned over" the more populous sections of the State. It is now more prevalent in the more sparsely settled sections, with the inevitable result that the reported incidence is low. Unfortunately, it is not possible to claim for public health work any credit for the present situation.

The immunization studies which were begun in the fall of 1931 have been pursued even more actively during 1934, using as an immunizing agent a formalized toxin solution. Whether the immunizing effect so obtained is due to a true toxoid or to the residual free toxin may be open to dispute. Suffice it to say here, however, that through the use of such a solution it has been possible to obtain in about 70 per cent of the children so treated a level of immunity sufficient to cause a negative Dick test. Immunization with this solution has been continued as a routine procedure in the schools for the feeble-minded and in the Department's hospitals for childhood tuberculosis. The children in many orphanages and schools have likewise been so treated, and the studies have been extended to certain groups of nurses. In Wellesley, East Bridgewater and Framingham community programs have been begun, and as the year closes a limited community program is being carried on in the city of Worcester. The effect of this immunization as measured by the prevention of scarlet fever in those so treated has been extremely encouraging, no case having occurred in a child immunized to the point of a negative Dick test. Furthermore, the results have shown a very high degree of specificity for the Dick test. This solution produces reactions which are so mild as compared with those following the usual scarlet fever immunizing agent that if its effectiveness can be demonstrated there seems little doubt as to its popular acceptance.

The Department has continued to assist boards of health in the collection of convalescent scarlet fever serum for passive immunization of family contacts of such cases. Among the boards of health which have obtained a supply for this purpose are Arlington, Brockton, Hingham, Lynn, Malden, Natick, Newton, Norwood, Peabody and Watertown.

Septic Sore Throat. Two hundred one sporadic cases of septic sore throat have been reported. The year was characterized by an apparent absence of any milk-borne outbreaks of this disease. It is questionable as to the exact significance of this reported incidence of sporadic cases, as the diagnosis of septic sore throat is based on very indefinite criteria. There are unquestionably many more cases of a severe and somewhat malignant throat infection than are indicated by the above figures. In the majority of these, cultural work would show the presence of hemolytic streptococci and probably many of these would in turn be of the epidemicus type. Unquestionably these cases are spread through the upper respiratory tract. The factors underlying the spread and contributing toward the development of clinical symptoms are, however, far from clear. As a public health problem these cases appear of importance solely because of the possible spread of an infection to a person who because of his occupation can in turn infect a cow. This in turn may mean an explosive widespread milk-borne outbreak if the milk is used raw. There is no evidence, however, to suggest that these sporadic cases are due to infected milk.

Smallpox. For the second consecutive calendar year Massachusetts has been free of smallpox, the last cases reported having occurred in Fitchburg in February, 1932. Throughout the United States the disease has been at an abnormally low level, irrespective of the vaccination status of the community. From the point of view of the public health this is extremely gratifying, provided, however, it does not lull us into a sense of complacent assurance that this freedom from the disease can be maintained forever without resorting to continued vaccination. The history of smallpox is so full of such remissions that there is no excuse for being deceived by the present situation.

Tuberculosis. The past year has seen a decline in both pulmonary and extrapulmonary deaths to figures lower than ever heretofore attained. For the first time in the history of the State the pulmonary tuberculosis deaths fell below 2,000. Coincidental with this decline in tuberculosis deaths was a slight increase in the reported incidence of the disease. Whether this is the result of better recognition and reporting or is the first sign of a deleterious effect of the recent economic conditions may be open to dispute. The former explanation is, however, the more plausible inasmuch as the death rate has declined so strikingly.

Typhoid Fever. The incidence of typhoid fever continued to decline during 1934, reaching a record low figure both for cases and deaths. One hundred thirty-four cases were reported as compared with 162 for last year. At the same time the deaths declined to 13, as compared with 22 for 1933. The incidence of this disease is now so low that a relatively small epidemic in a single year might spoil an otherwise enviable record. The largest local outbreak during the year occurred in Mansfield, where four cases occurred simultaneously. Although it was virtually impossible to obtain accurate information, there is no question but that these cases were related and directly traceable to a carrier. Of the cases reported, the source of infection was found in 28 instances, 21 of which were traced to recognizable carriers. No cases were recognized that were directly traceable to either public water supplies or milk. The following table shows the typhoid carrier discovery rate for the past six years:

YEAR	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases
1929	307	6	2.0	4	1.3
1930	318	9	2.8	5	1.6
1931	250	6	2.4	4	1.6
1932	214	13	6.1	10	4.7
1933	162	19	11.7	14	8.6
1934	134	18	13.4	13	9.7

Of particular note in the above tabulation was the discovery in Fall River of two carriers through routine culturing of those who had had typhoid fever during recent years. This work was carried on jointly by the Fall River Board of Health and this Department, with some assistance for the former by the ERA. It demonstrates the essential soundness of a program of carrier discovery through selective culturing of those who have had typhoid fever in recent years. It also shows that such a program could be carried on by any board of health, utilizing for the field work the normal nursing staff, though under such circumstances the work would have to be spread out over a period of many months so as not to interfere with the other nursing duties.

The list of active typhoid carriers has grown from 91 at the beginning of the year to 98. Two carriers died from a condition having no relation to their carrier state. Two carriers underwent operation in the hopes of curing their carrier condition. Four carriers were removed from the list as cured following gall bladder removal. One of these was the ten year old Milford boy whose operation was referred to in last year's report, this case being of considerable interest in that through this operation this boy has been able to resume his normal place in the community without any further menace to his associates. The carrier referred to last year who had apparently failed of establishing a cure through the operation has been continued under supervision and as the year closes there is very definite evidence that the biliary passages have now cleared themselves of typhoid organisms and that a permanent cure will have been established. Only the collection of a bile specimen and diarrheal specimens remain before her name can be removed from the carrier list. This brings the number of operations to twenty-three, and in no case is there as yet any evidence of failure to establish a cure thereby.

It is gratifying to note that during the past few years there has been increasing attention to the collection of release cultures from all patients ill with typhoid fever.

As shown by the following table, 98 per cent of those having typhoid were kept under observation until at least two negative cultures had been obtained during the convalescence. Only three patients were released from observation without this precaution, these patients being in New Bedford, Taunton and Tewksbury. Of those recovering from typhoid, six are still under observation as probable carriers, though they will not be considered as permanent carriers until a year from the date of their onset. This careful supervision of the current cases inevitably means that fewer unrecognized carriers will be released into the community to cause infections among their associates.

Year	Reported Cases	Deaths	Living Cases	Number Having Release Cultures	Per Cent Release Cultures
1928	310	36	274	178	65
1929	307	42	265	191	72
1930	318	38	280	236	84
1931	250	30	220	192	87
1932	214	25	189	172	91
1933	162	22	140	132	94
1934	134	13	121	118	98

Undulant Fever. Fifteen cases of undulant fever were reported. In all instances the source of infection was apparently raw milk. So long as certain persons insist upon using such milk, cases of this disease will occasionally appear. Several of the victims during the past year have been sadly disillusioned as to raw milk, realizing for the first time apparently that the milk from a model dairy boasting a fancy herd might still be the vehicle for the transmission of human disease.

Whooping Cough. With 12,659 cases of whooping cough reported for the year, this disease reached a higher incidence than ever previously recorded. Although the deaths reached the highest level since 1930, the case fatality rate was the same as for 1933, which was the lowest on record. Because of the decline in other diseases whooping cough is rapidly coming to the point where it may be thought of as the communicable disease, exclusive of tuberculosis and pneumonia, which causes the greatest number of human deaths. Encouraging work is being reported from other parts of the country indicating that we may ultimately look forward to a fairly satisfactory immunizing agent against this disease.

OUTBREAKS

March. Gastro-enteritis; Cohasset. Several hundred cases of gastro-enteritis spread apparently through water. Probably due to temporary use of wells, the last use of which in 1931 was followed by a similar disturbance.

March. Gastro-enteritis; Fitchburg. Gastro-enteritis affected some two or three thousand people in one section of the city. The disturbance was apparently water-borne, confined to one section of the high pressure system and an adjoining part of the low pressure system where the two systems are cross connected. Although exact proof as to etiology is lacking, it is known that CWA workers had been employed on the watershed; there had been no facilities for the disposal of their excreta; and that the outbreak followed closely upon the thaw with consequent rapid run-off on the watershed.

June. Gastro-enteritis; Natick. Following a church supper attended by over seventy people, about fifty persons became acutely ill with onsets varying from less than one hour to three or four hours. Chicken salad was unquestionably responsible for the illness, the chicken of which was the responsible vehicle. Although symptoms strongly suggested staphylococcal infection, no etiological agent was found in the laboratory.

June. Gastro-enteritis; Dedham. Following a supper at a private school, about twenty-five out of forty persons became ill with a somewhat milder condition than occurred in Natick. Infection apparently spread through chicken salad.

June. Gastro-enteritis; Maynard. For three or four weeks sporadic cases of gastro-enteritis occurred in Maynard, culminating in an outbreak of some two or three hundred cases. Examination of the water supply showed demonstrable contamination, though the epidemiological facts would not warrant the conclusion that the cases were of necessity water-borne. Widals obtained from some of the cases showed a negative reaction.

July. Bacillary dysentery; Waverley. Beginning about the middle of May there had been intestinal disturbances among attendants and patients in the Fernald School, reaching a total of something over one hundred cases. Stool specimens revealed bacillary dysentery of the Hiss-Y or Flexner type.

August. Bacillary dysentery; Northampton. An extensive outbreak of bacillary dysentery of the Hiss-Y type at the State Hospital, apparently spread through contact infection.

August. Gastro-enteritis; Dracut. The occurrence of a small outbreak in the Collinsville section suggested a contact infection spread through the upper respiratory tract.

August. Gastro-enteritis; Norfolk. An explosive outbreak of gastro-enteritis at the Norfolk Prison Colony beginning in the farm colony outside the prison walls about twelve to twenty-four hours before appearing inside the walls. The source of infection was not found, though it was rather definitely proven that food was not the cause.

August. Gastro-enteritis; Marshfield. An outbreak affecting about thirty boys and girls at a Green Harbor camp. On August 1, three of the boys at the camp started out on a hike and were picked up by a clergyman and taken to lunch at the house that he was visiting. The next evening the three boys became ill. A boy at the home they had visited became ill at the same time. The remainder of the cases developed within the next few days. The epidemiological findings pointed strongly toward a respiratory spread.

September. Bacillary dysentery; Warren. Bacillary dysentery of the Hiss-Y type in three related families in West Warren. In each family what was considered a gastro-enteritis had gone progressively through the members of the household. From a single member of two different families organisms of the Hiss-Y strain were isolated. A well used in common by the three families was found to be grossly polluted. In each family the infection was apparently spread by contact.

September. Typhoid Fever; Watertown. Investigation of three cases of typhoid fever with one death in a Watertown family brought to light a typhoid carrier in Ontario, at whose home the patients had visited shortly before their illness.

October. Scarlet fever; Agawam. About twenty-five cases of scarlet fever and many cases of sore throat developed among one hundred and fifty persons attending a wedding breakfast. The majority of these cases occurred in and around Springfield. The probable vehicle of infection was the chicken salad and the possible source of the infection was the bride's mother, who, with a guest from Brooklyn prepared the salad.

October. Gastro-enteritis; Salem. About forty cases of gastro-enteritis appeared among hospital employees and patients, apparently due to contact and food infection. The first known case was in a maid who apparently infected employees of the diet kitchen. The infection of the latter was followed by an explosive outbreak throughout the hospital.

October. Typhoid fever; Mansfield. Investigation of four cases of typhoid fever occurring almost simultaneously in a particular social group brought to light typhoid carrier in the person of the mother of one of the patients. There is good reason to presume that the other cases were infected through this same source.

October. Gastro-enteritis; Pittsfield. An explosive outbreak of about thirty cases occurred in a CCC camp. These were probably due to drinking from a brook which was open to pollution.

December. Gastro-enteritis; Monroe. Investigation of gastro-enteritis showed that the only common factor was a water that was chlorinated during the summer and not during the winter. All of the cases appeared during the spring months before chlorination began and in the fall after chlorination ended. There were no cases reported during the period when the ground and surface coverings were frozen.

GONORRHEA AND SYPHILIS

During 1934 reports of gonorrhea or syphilis were received from 1,057 physicians, as compared to 1,067 in 1933. Thus 17.6 per cent of the 6,019 physicians known to the Department reported one or the other or both of these diseases during 1934. Gonorrhea was reported by 845 (14 per cent) and syphilis by 360 (6 per cent), an increase of 21 in those reporting gonorrhea and a decrease of 68 in those reporting syphilis as compared to 1933. Of the 1,057 reporting, 200 had not reported either disease previously (18.9 per cent of those reporting). Since the first of 1930, when reports were first made directly to this Department, 2,203 different physicians have reported either disease or both at one time or another, approximately 36.6 per cent of all physicians in the State. This is to be compared with the evidence which the Department has that slightly over 50 per cent of the physicians in the State treat either gonorrhea or syphilis or both.

There was a decrease of 53 cases of gonorrhea from 6,591 in 1933 to 6,538 in 1934, and an increase of 5 cases of syphilis from 4,466 in 1933 to 4,471 in 1934 (Table IV and Table IX). Physicians reported 48.4 per cent of the gonorrhea (exactly the same as in 1933); clinics reported 43.2 per cent as compared to 43.6 per cent last year; and institutions reported 8.4 per cent as compared to 8.0 per cent in 1933. Physicians reported 20.6 per cent of the syphilis as compared to 20.4 per cent last year; clinics reported 65.8 per cent as compared to 64.2 per cent last year; and institutions reported 13.6 per cent as compared to 15.4 per cent in 1933. Thus there was relatively little change either in the total number of cases of either disease reported or in the distribution of source of report.

Of the 355 communities in the State, only 72 reported no cases of either gonorrhea or syphilis, as compared to 101 last year.

There were 159 deaths from syphilis at a death rate of 3.7 per 100,000 population. If deaths from general paralysis of the insane and tabes dorsalis are included, the total deaths from syphilis was 367 at a rate of 8.5 per 100,000 population (Table XIV).

There is reasonably good evidence of a decline in syphilis in Massachusetts. This evidence has five sources:

> First, the death rate from syphilis in all forms has declined from a rate of 15.5 per 100,000 population in 1918 to 8.5 per 100,000 in 1934.
>
> Secondly, admissions for general paralysis of the insane to mental disease hospitals in Massachusetts have declined since 1917 from a rate of 8.7 per 100,000 population to just over 5 per 100,000 in 1934.
>
> Thirdly, although the total number of cases of syphilis reported during each of the last five years has remained fairly constant for each year (between 4,200 and 4,500 cases), the rate per 100,000 population of early syphilis (primary and secondary) has declined steadily among males from 43.2 to 30.8 and among females from 27.8 to 18.7. Thus the maintenance during the last five years of total cases at an approximate level is to be accounted for by the progressively more frequent discovery of late syphilis.
>
> Fourthly, 17 prenatal clinics in the State have reported for some 15,000 pregnant women examined for syphilis during the past five years that only 2.79 per cent had positive or doubtful Wassermanns as compared to 80.3 per cent in a series of more than 10,000 pregnant women reported by Hinton for the five years, 1915–1919.
>
> Fifthly, new admissions to the 14 State-aided clinics for syphilis have declined since 1925 from 3,519 to 2,321 in 1934. This is a decline in new admissions of 34.1 per cent and has taken place in face of the fact that the present economic situation should tend to force more patients into the clinics and also in spite of the fact that other clinics in the same out-patient departments are more and more adopting serological examination of their patients as a routine procedure.

It is regrettable, but in a sense confirmative of this apparent decline in syphilis, that there has been no evidence whatsoever of a decline in the prevalence of gonorrhea, although there has been some apparent shifting of the reported infections out of the earlier and into the older age groups.

Clinics. The Taunton Board of Health has opened and is maintaining a small clinic for the treatment of gonorrhea and syphilis in that city, and a clinic for the treatment of these diseases at the Beverly Hospital has come to light. Neither of these new clinics sends monthly reports to this Department so that our clinic statistics are still based upon reports from the twenty-six clinics which have been in existence for many years.

The Lynn Clinic now has a full-time social worker and thus becomes the fourth clinic to add this service during the past four or five years. The clinic has been taken over administratively by the Lynn Hospital, and the Lynn Health Department contributes to its maintenance by paying at least in part for the treatment at the clinic of Lynn residents.

The fourteen clinics aided by this Department admitted 2,740 new cases of gonorrhea and 2,321 new cases of syphilis, a total of 5,061 for this year as compared to 5,150 in 1933. These patients made 232,865 visits, an increase of 4,425 over 1933. The total attendance at these fourteen clinics was 13,585 different individuals, an increase over 1933 of 104. Thus the decline in new admissions, the increase in visits and the increase in individuals attending the clinics indicate that more regular and substantial treatment is being given to the patients attending these clinics.

There is good evidence that clinics are not using the Department's "Information for the Patient" to the greatest advantage. Clinics report more than 65 per cent of the cases of syphilis but have used barely 4,000 pamphlets on syphilis as compared to nearly 12,000 used by physicians during the last four years. At least 18,000 patients with syphilis have passed through the clinics during that period, which would indicate that only one out of every six patients has received this literature. There is evidence also that of the 17,000 patients with gonorrhea, only two out of every three have been given the Department's literature. It would be assumed, naturally, that since the clinic physicians and personnel in general are pushed to the extreme to handle the large number of clinic patients, they would welcome informative material to supplement what little may have been said in a personal way in the extremely short time available to each patient.

The experiment has been tried of publishing "now and then" a bulletin entitled "This and That" for the purpose of calling to the attention of clinics certain facts of importance. Three such bulletins have been published to date, the first discussing the importance of time factors in the clinic, the second discussing delinquencies from treatment, and the third, the use of informative literature.

Boards of Health. In the fall of 1933 all of the clinics in the State were advised to charge local boards of health for services rendered in treating patients who have gonorrhea or syphilis and who are unable to pay the relatively small clinic fee. For the year 1934, reports from six clinics disclose that of bills totaling $3,516.26, there have been collected from boards of health $2,476.27. This is excellent evidence that the various boards of health are beginning to assume their legal responsibilities. These six clinics collected from forty-nine different boards of health.

One hundred and fifty-three boards of health followed 3,578 persons reported by name for having prematurely discontinued treatment or as having been exposed to or responsible for the infections of others. Forty-five and eight-tenths per cent of these persons were found as compared to 44.9 per cent of 3,989 persons so reported last year. No final reports of the results of their investigations could be obtained from fifty cities and towns in 4.9 per cent of the cases.

Arsenicals. The total distribution of arsenicals increased from 49,403 grams in 1933 to 54,896 grams in 1934. Physicians received 19.2 per cent of the arsenicals distributed as compared to 16 per cent last year, and 418 different physicians applied for it as compared to 354 last year. Only 65.2 per cent of these 418 physicians have reported syphilis since the distribution of arsenicals was begun, and only 62.7 per cent of the 1,071 physicians who have ever used State arsenicals have reported syphilis since the distribution of arsenicals to physicians was begun.

Laboratory. The Wassermann Laboratory reported 119,819 blood and spinal fluid examinations for syphilis, and the Bacteriological Laboratory reported 9,683 smears examined for gonorrhea.

In April of this year the Hinton test became the routine serological test for syphilis at the State Laboratory, following conferences with the State's outstanding syphilologists and serologists.

Education and Information. During the year the medical staff of the Subdivision lectured to 51 different groups, chiefly professional, such as, nurses, medical students and physicians. In addition, many thousands of persons were reached by our Public Health Education Worker, who, as full-time lecturer jointly for this Department and the Massachusetts Society for Social Hygiene, is constantly in the field.

One ten-minute broadcast on gonorrhea and syphilis was given over WEEI and was the eighth in a series of such broadcasts over the last four years. The Division of Adult Hygiene, through which the Department's broadcasting service is arranged, sends similar material to some seventy newspapers throughout the State. It is impossible to learn how many of these newspapers use this material because relatively few of them contribute to the Clipping Bureau Service. The Division of Adult Hygiene reports that it has record of seven papers having used the material on gonorrhea. During the Social Hygiene Institute in Springfield, the Springfield newspapers contributed liberally of their space, and when Dr. Parran, Commissioner of Health of New York State, was refused permission to mention syphilis over the Columbia network, several Massachusetts newspapers gave publicity to the incidence and some of them commented editorially upon the "prudish attitude" of that broadcasting system.

The Department has cooperated with the Massachusetts Society for Social Hygiene in conducting two institutes during the year—one for the Massachusetts State League of Nursing Education and the other for the City of Springfield. Both of these institutes were well attended and should contribute materially to the better understanding of these two diseases. It is hoped that out of the institute for the Massachusetts State League of Nursing Education there will come the development of social hygiene as an integrated part of courses in the nurses' training schools.

During the year some 90,000 pieces of literature have been distributed by the Subdivision.

The Medical Profession. As a direct result of a meeting called by the Department in 1930 the Massachusetts Neisserian Medical Society was organized and for four years has been making a critical study of the management of gonorrhea, both for the enlightenment of its own members and for that of the medical profession as a whole. The Society has already published two papers and the third is in the hands of the printers. This local Society has attracted such national attention that in June, during the sessions of the annual meeting of the American Medical Association, the American Neisserian Medical Society was organized. It has 115 charter members from 24 different states. This is good evidence of increasing interest on the part of the medical profession in a disease which has been well characterized by Pelouze as "the stepchild of medicine."

Progress was also indicated by the formation in the Massachusetts Medical Society of a section on Dermatology and Syphilology.

Lobar Pneumonia Study

The fourth year of the pneumonia study, made possible by the Commonwealth Fund of New York, has been completed. Serum has been made avilable in additional areas so as to now serve about two-thirds of the population of the State. Use of the serum has continued to give striking results in certain cases, the fatality rate of Type I pneumonia being reduced approximately two-thirds and Type II about one-half, these figures being based on the treatment of over 500 patients. The acceptance by the National Institute of Health of a standard unit for the serum (pneumococcus antibody solution) has made possible the evaluation of the result in terms of unitage. These figures show that since the beginning of the study the potency of the serum produced has increased over 100 per cent. As dosage has been heretofore based upon volume, these studies indicate that it may be possible to reduce the amount of serum used on a patient without lessening its effectiveness. Consequently, it is planned during the coming pneumonia season to base the dosage upon units. If this is successful it will make possible a considerable saving in serum which will be of great importance in the problem of the ultimate take-over of serum production and distribution at State expense.

In the diagnostic laboratory the work on the Neufeld method of typing has been continued, a report being published on the basis of 760 specimens examined. The results through this method have been so successful that when the period of study is concluded, it will probably, where applicable, supplant all other methods of typing. This will be of great importance from both the clinical and laboratory standpoint.

Studies in the improvement of the serum have been continued at the Antitoxin and Vaccine Laboratory. Reference has already been made to the increased potency in terms of units. There are still many problems in the elimination of reaction-producing substances, though, since the development of methods for testing on monkeys, chill reactions have been materially reduced.

The principal problem during the year, aside from the ever-present problem of serum improvement, has been the formulation of plans for the continued distribution of the pneumonia serum under State auspices after the withdrawal of outside financial assistance. The cost of the serum is too great to permit of the same unlimited distribution as for other biologic products. Yet for the serum to be effective it must be made promptly available for those patients who may profit from it. During the past year a plan has been tried in certain areas whereby the serum is entrusted to hospital laboratories prepared to do pneumococcus typing, the serum to be released only if the sputum yields a Type I or II pneumococcus, and the patient has been ill less than ninety-six hours. The development of rapid typing through the Neufeld method eliminates delay through waiting for the laboratory findings. Such a plan of distribution makes the serum available to every licensed practitioner, yet reduces wastage of serum on patients to whom it can be of no possible benefit. This plan is being tried in the Boston, Newton, Cambridge, Quincy, Norwood, Greenfield, North Adams and Worcester areas, and appears to be successful. The problem that presents itself during the coming year is that of extension of serum so that by the end of 1935 it will be available in all sections of the State. This means development of typing services in many additional hospitals, as well as educational work among the physicians to make them better acquainted with the details of serum therapy.

Milk

The past year has been unusually free from the point of view of milk-borne disease, no cases of typhoid, scarlet fever or septic sore throat being directly traceable to such a source. Fifteen cases of undulant fever have appeared, in almost all of which there was a history of consumption of raw milk from a herd known to be infected with contagious abortion.

The most significant development during the year from the point of view of the protection of the milk supply was in the city of Attleboro, where a milk dealer went to court to challenge the validity of a regulation requiring pasteurization or certification of all milk. This case, which was heard in the Superior Court, resulted in a verdict upholding the regulation, but the case has now been appealed to the Supreme Court. This case is of more importance than merely its bearing on the Attleboro situation, as similar regulations are being enforced in some dozen other Massachusetts cities and towns. The Department lent its support to the Attleboro Board of Health in this case and assisted in obtaining a large number of expert witnesses for the hearing. The Board of Health of Quincy has adopted the same regulation, but has withheld its enforcement pending the outcome of the appeal to the Supreme Court. In the meantime, however, similar regulations have been adopted in Cambridge, Framingham, Stoneham and Wellesley, and are under consideration in a number of other communities. Such regulations, which have been upheld in the Supreme Courts of five other states, present the only protection against the continued spread of communicable disease through milk.

District Health Units

(1) *Cape Cod Health Bureau.* There has been no outstanding event or development in the activities of this county health unit during the past year. The routine work has been carried on efficiently, but little or no effort made to extend the scope of the program. A survey of the program was made by one member of the County Medical Society, but brought to light no new worth-while suggestions.

(2) *Southern Berkshire Health Unit.* The outstanding event of the past year has been the first expression of public opinion through vote of town meeting. In

the annual spring meeting of the sixteen towns an article was inserted as to the entry of the town in a formal union, under the provisions of Chapter 209 of the Acts of 1932. Favorable votes were obtained in Becket, Great Barrington, Monterey, Mount Washington, Richmond, Sheffield and Tyringham. Adverse votes were passed in Egremont and Sandisfield. New Marlboro failed to take any action, while in the towns of Alford, Lee, Lenox, Otis, Stockbridge and West Stockbridge the article was laid on the table. During the summer the seven towns accepting the article have organized to form the legally constituted Southern Berkshire Health District, with Dr. Mortimer T. Cavanaugh as Chairman. At the meeting of 1935 the article will be resubmitted to the towns which have not yet joined the union and it is anticipated that favorable action will be taken in at least some of them.

As a means of disseminating knowledge as to the aims and accomplishments of public health work, a series of "Health Days" was conducted in many of the Berkshire towns. Such "Health Days" were held in the spring in Alford, Chester, Egremont, Sheffield and West Stockbridge. During the fall similar "Health Days" have been conducted in Monterey, Mount Washington, New Marlboro, Otis and Sandisfield.

The ultimate future of this union is, of course, problematical. There is unquestionably a nucleus of towns that are interested in the conduct of a modern public health program such as is obtainable only through inter-town cooperation. Unquestionably there are many people in other towns who are sympathetic to the union, but the financial difficulties of these towns and an aggravated sense of town independence constitute serious stumbling blocks. Only time will tell whether or not a sufficiently large number of towns will be interested to make such a unit a feasible proposition.

(3) *Nashoba Health District.* This district has seen few outstanding developments during the past year. The energies of the personnel have been devoted to strengthening the program of work and to the dissemination of knowledge as to the work of the union. The first vote at town meeting will be taken this coming spring, when an article will be inserted in each town meeting aimed at the creation of a legal health union. It has been felt advisable by the local representatives of the towns in this district to provide in this warrant for complete take-over as of January 1, 1936. It is, of course, too early to predict what action will be taken, though there are reasons for believing that a substantial number of towns are already sufficiently appreciative of the union so that favorable action will be taken in them.

Local Board of Health Records

It has long been realized by this Department that in many communities the board of health records pertaining to communicable diseases were in such an unsatisfactory state that much of their value was thereby lost. In many instances owing to this condition the maximum use was not being made of the records in directing future control programs. Particularly has this been true with respect to the diphtheria immunization records.

During the past year, through the generosity of the Commonwealth Fund, it has been possible to have a member of the divisional staff visit many boards of health to analyze their records and assist in the establishment of permanent improvements. Miss Helen M. Smith, statistical clerk in the Division, was delegated to this work. Much of her time has, of course, been spent with the Southern Berkshire and Nashoba Units, inasmuch as these being likewise supported by the Commonwealth Fund had a prior claim on her time. Other communities visited during the year have been Braintree, Brockton, Everett, Framingham, Lawrence, Ludlow, Lynn, Malden, Medford, Natick, New Bedford, Newburyport, Norwood, Southbridge, Watertown and Wellesley. In some of these several separate visits have been made. In all instances this service has apparently been greatly appreciated and it is therefore a source of considerable satisfaction that funds are now available for the continuation of it for another year.

District Health Officers

During the formative stages of the Southern Berkshire and Nashoba Units it was deemed advisable to delegate one District Health Officer whose duties should be largely in connection with these areas. Toward the end of 1933 an adjustment was made whereby the contacts with these should be made by Dr. Miner and Dr. Dudley, respectively. This change in policy was followed shortly by the resignation of Dr. Knowlton, who assumed the position as Assistant Superintendent of the Peter Bent Brigham Hospital. His position was filled by the transfer of Dr. Sullivan from the Pondville Hospital, whereupon a rearrangement of the districts was made so as to provide for seven rather than six districts. This was effected through an enlargement of the Metropolitan area, following which this area was divided into two parts, Dr. Sullivan taking charge of the southern portion. This has made it possible to give a much more adequate service to a group of the towns in this section of the State.

The District Health Officers have carried on efficiently the usual duties assigned to them. With the increasing sense of local responsibility for diphtheria immunization clinics less of their time is at present devoted to this. Whatever time has been thus released has been more than demanded during the past year with the change of the tuberculosis clinics from a State to a local basis. During the next few years more of their time will therefore be taken over for the problem of childhood tuberculosis clinics.

BACTERIOLOGICAL LABORATORY

As shown by the accompanying table, the demand on the Bacteriological Laboratory has been heavier during the past year than in 1933, more specimens being examined than in any previous year. This increase in load is particularly significant in the face of a marked decline in both diphtheria and typhoid. In the case of the latter it has meant more intensive work on the residual cases. Much of the increase in stool cultures was due to the outbreaks of dysentery in several institutions under the Department of Mental Diseases, as well as to the follow-up of former cases of typhoid under ERA auspices.

The most significant work in the laboratory during the past year has been the continuation of the studies on pneumococcus typing. These studies have shown very conclusively that the Neufeld method can apparently be substituted for other methods without sacrificing accuracy. This is of considerable importance in view of the fact that it reduces the time required for typing from a minimum of four or five hours to only a few minutes. This shortened time makes it therefore possible to delay serum treatment until the type can be determined, thus avoiding the unnecessary use of serum on patients who could not be expected to benefit from it.

Studies have likewise been conducted as to the comparative results of guinea pig inoculation and cultural methods with specimens to be examined for tubercle bacilli. No definite conclusions have as yet been drawn from these studies.

PUBLIC HEALTH EDUCATION

During the past year speakers in the Division gave 77 talks, exclusive of those referred to under Gonorrhea and Syphilis. Over 5,400 people were reached. In addition, three radio talks were given.

TABLE I. — *Anterior Poliomyelitis*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1930	503	11.8	35	.8	7.0
1931	1,428	33.4	114	2.7	8.0
1932	61	1.4	13	.3	21.3
1933	353	8.2	32	.7	9.1
1934	76	1.8	9	.2	11.8

TABLE II. — *Diphtheria*

1930	3,322	78.1	182	4.3	5.5
1931	2,381	55.7	130	3.0	5.4
1932	1,811	42.1	107	2.5	5.9
1933	1,041	24.1	86	2.0	8.3
1934	629	14.5	50	1.2	7.9

Table III. — *Epidemic Cerebrospinal Meningitis*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1930	174	4.1	59	1.4	33.9
1931	101	2.4	30	.7	29.7
1932	83	1.9	34	.8	41.0
1933	50	1.2	25	.6	50.0
1934	66	1.5	28	.6	42.4

Table IV. — *Gonorrhea*

1930	6,974	163.9	7	.2	
1931	7,201	168.4	5	.1	
1932	6,738	156.8	4	.1	
1933	6,591	152.6	7	.2	
1934	6,538	150.7	11	.3	

Table V. — *Lobar Pneumonia*

1930	4,333	101.8	1,883	44.3	43.5
1931	3,873	90.6	1,718	40.2	44.4
1932	4,028	93.7	1,688	39.3	41.9
1933	4,277	99.0	1,825	42.3	42.7
1934	3,976	91.6	1,601	36.9	40.3

Table VI. — *Measles*

1930	27,137	637.8	137	3.2	.5
1931	16,581	387.8	64	1.5	.4
1932	19,763	459.9	64	1.5	.3
1933	15,067	348.9	27	.6	.2
1934	44,817	1,032.8	91	2.1	.2

Table VII. — *Scarlet Fever*

1930	9,408	221.1	98	2.3	1.0
1931	12,782	298.9	101	2.4	.8
1932	16,580	385.8	145	3.4	.9
1933	12,284	284.5	108	2.5	.9
1934	8,391	193.4	76	1.8	.9

Table VIII. — *Smallpox*

1930	2		–		
1931	6		–		
1932	43		–		
1933	–		–		
1934	–		–		

Table IX. — *Syphilis*

1930	4,197	98.6	149	3.5	
1931	4,447	104.0	168	3.9	
1932	4,530	105.4	162	3.8	
1933	4,466	103.4	154	3.6	
1934	4,471	103.0	159	3.7	

Table X. — *Tuberculosis, Pulmonary*

1930	4,696	110.4	2,423	56.9	
1931	4,421	103.4	2,306	53.9	
1932	3,994	92.9	2,041	47.5	
1933	3,541	82.0	2,059	47.7	
1934	3,585	82.6	1,902	43.8	

TABLE XI. — *Tuberculosis, Non-Pulmonary*

1930	587	13.8	311	7.3
1931	555	13.0	248	5.8
1932	466	10.8	260	6.1
1933	466	10.8	222	5.1
1934	448	10.3	214	4.9

TABLE XII. — *Typhoid Fever*

1930	318	7.5	38	.89	11.9
1931	250	5.8	30	.70	12.0
1932	214	5.0	25	.58	11.7
1933	162	3.8	22	.50	13.6
1934	135	3.1	13	.3	9.6

TABLE XIII. — *Whooping Cough*

1930	10,750	252.6	182	4.3	1.7
1931	7,174	167.8	88	2.1	1.2
1932	7,881	183.4	107	2.5	1.4
1933	9,834	227.7	97	2.2	1.0
1934	12,659	291.7	125	2.9	1.0

TABLE XIV. — *General Paralysis of the Insane*

	DEATHS		FIRST ADMISSIONS TO STATE INSTITUTIONS FOR MENTAL DISEASES		
YEAR	Deaths	Death Rate per 100,000	First Admissions	Rate per 100,000	Per Cent of All First Admissions
1930	168	3.9	227	5.3	7.2
1931	166	3.9	203	4.8	6.4
1932	166	3.9	206	4.8	6.6
1933	147	3.4	209	4.8	6.5
1934	161	3.7	226	5.2	6.9

TABLE XV. *Gonorrhea and Syphilis Treated in Clinics and Institutions*

Clinics

YEAR	NEW CASES			
	Gonorrhea	Syphilis	Visits	Number of Clinics
1930	2,747	2,968	217,452	25
1931	3,040	2,631	206,433	25
1932	2,978	2,876	249,263	26
1933	3,117	3,063	261,867	26
1934	3,003	2,998	268,520	26

Institutions

YEAR	NEW CASES			
	Gonorrhea	Syphilis	Visits	Number of Clinics
1930	356	723	-	25
1931	436	823	-	24
1932	522	987	-	24
1933	464	946	-	24
1934	435	803	-	24

TABLE XVI. — *Grams of Arsphenamine, Sulpharsphenamine and Neoarsphenamine Distributed*

YEAR	Arsphenamine	Sulpharsphenamine	Neoarsphenamine	Total
1930	9,802	12,915	22,284	45,001
1931	9,235	13,676	26,987	49,898
1932	8,681	8,394	27,815	44,890
1933	7,984	4,339	37,080	49,403
1934	8,037	4,453	42,407	54,897

TABLE XVII.—*Grams of Arsenicals Distributed to Clinics, Institutions and Physicians*

YEAR	Clinics and Institutions	Physicians
1930	36,103	8,898
1931	40,714	9,183
1932	36,903	6,987
1933	41,549	7,854
1934	44,284	10,613

TABLE XVIII.—*Laboratory Examinations*—1934

	Positive	Negative	Total for 1934	Total for 1933
Diphtheria:				
Diagnosis	191	6,401	6,592	7,263
Release	512	2,483	2,995	1,559
Tuberculosis:				
Sputum	805	4,438	5,243	5,037
Animal Inoculations	20	203	223	196
Typhoid Fever:				
Widal	109	1,942	2,142*	2,237**
Culture (blood, feces, urine, etc.)	144	5,903	6,047	3,860
Gonorrhea	1,955	7,728	9,683	9,019
Malaria	1	51	52	53
Pneumococcus type determinations	–	–	1,257	1,314
Hemolytic streptococci	–	–	1,906	1,353
Spinal fluid for meningococci	–	–	15	4
Undulant fever	62	395	457	374
Miscellaneous	–	–	1,187	1,213
Total			37,799	33,482

Includes 91 atypical.
**Includes 94 atypical.

TABLE XIX. — *Laboratory Examinations for Rabies**

YEARS	Positive		Negative	Total Animals Examined
	Dogs	Other Animals		
1930	292	18	161	471
1931	290	14	211	515
1932	125	6	130	265
1933	139	5	153	301
1934	242	9	234	497

*Wassermann Laboratory

Cases and Deaths, with Case and Death Rates per 100,000 Population for Reportable Diseases During the Year 1934*

Diseases	Cases	Case Rate per 100,000 Population	Deaths	Death Rate per 100,000 Population	Fatality Rate (PerCent)
Actinomycosis	1	.02	1	.02	
Anterior Poliomyelitis	76	1.8	9	.2	11.8
Anthrax	5	.1	0	–	
Chicken Pox	10,990	253.3	12	.3	.1
Diphtheria	629	14.5	50	1.2	7.9
Dog Bite	8,863	204.3	–	–	
Dysentery, Amebic	31	.7	3	.07	9.7
Dysentery, Bacillary	238	5.5	17	.4	7.1
Encephalitis Lethargica	35	.8	25	.6	
Epidemic Cerebrospinal Meningitis	66	1.5	28	.6	42.4
German Measles	1,005	23.2	–	–	
Gonorrhea	6,538	150.7	11	.3	
Leprosy	3	.07	–	–	
Lobar Pneumonia	3,976	91.6	1,601	36.9	40.3
Malaria	27	.6	2	.05	7.4
Measles	44,817	1,032.8	91	2.1	.2
Mumps	4,310	99.3	2	.05	.05
Ophthalmia Neonatorum	1,072**	24.7	–	–	
Paratyphoid Fever	6	.1	1	.02	16.7
Pellagra	9	***	13	.3	
Rabies	1	.02	1	.02	100.0
Scarlet Fever	8,391	193.4	76	1.8	.9
Septic Sore Throat	201	4.6	60	1.4	29.9
Smallpox	–	–	–	–	
Syphilis	4,471	103.0	159	3.7	
Tetanus	20	.5	20	.5	100.0
Trachoma	33	.8	–	–	
Trichinosis	46	1.1	4	.09	8.7
Tuberculosis, Pulmonary	3,585	82.6	1,902	43.8	53.1
Tuberculosis, Other Forms	448	10.3	214	4.9	47.8
Tuberculosis, Hilum	855	19.7	–	–	
Typhoid Fever	134	3.1	13	.3	9.7
Typhus Fever	2	.05	–	–	
Undulant Fever	15	.3	–	–	
Whooping Cough	12,659	291.7	125	2.9	1.0
	113,559	2,617.1	4,440	102.3	

*Population — 4,339,210

**35 of these were gonorrheal ophthalmia.

***Incompletely reported.

Cases and Deaths for all Reportable Diseases by Months—1934

	JAN.		FEB.		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Actinomycosis	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	1	1
Anterior Poliomyelitis	2	–	–	1	2	–	1	–	4	1	5	2	20	–	16	1	8	2	10	1	7	1	1	–	76	9
Anthrax	1	–	2	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	5	–
Chicken Pox	1649	–	1157	–	1004	2	1001	2	993	1	1149	1	371	1	87	–	101	–	374	1	1324	–	1780	4	10990	12
Diphtheria	72	4	27	3	63	3	59	7	46	4	41	4	43	4	51	2	37	3	70	6	52	6	68	4	629	50
Dog Bite	340	–	356	–	498	–	654	–	843	–	1262	–	1405	–	1031	–	756	–	701	–	554	–	463	–	8863	–
Dysentery, Amebic	1	–	4	–	6	–	2	–	3	2	7	–	1	1	1	–	2	–	1	–	2	–	1	–	31	3
Dysentery, Bacillary	1	–	2	–	3	–	–	1	2	–	12	1	6	–	146	10	45	4	11	1	9	–	1	–	238	17
Encephalitis Lethargica	7	6	3	3	4	4	7	1	3	2	1	2	2	2	–	–	–	–	1	2	3	1	4	2	35	25
Epidemic Cerebrospinal Meningitis	6	4	6	–	7	2	8	6	4	1	5	1	6	3	2	–	5	2	5	3	2	2	10	4	66	28
German Measles	47	–	57	–	57	–	70	–	148	–	92	–	25	–	15	–	19	–	45	–	102	–	328	–	1005	–
Gonorrhea	516	–	416	1	487	1	431	2	535	2	566	2	559	–	680	2	556	–	626	–	596	1	570	–	6538	11
Leprosy	–	–	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
Lobar Pneumonia	710	255	550	242	551	237	532	191	329	126	241	68	155	45	90	38	90	49	181	80	262	140	285	130	3976	1601
Malaria	5	–	1	–	1	–	–	–	2	–	1	1	2	–	2	–	2	–	2	1	7	–	2	–	27	2
Measles	6069	12	8635	24	9891	20	9138	17	5724	11	3380	5	775	–	95	1	43	–	91	–	326	1	650	–	44817	91
Mumps	651	–	487	–	644	1	549	–	576	–	467	–	207	–	131	–	75	–	98	–	183	–	242	1	4310	2
Ophthalmia Neonatorum	123	–	46	–	177	–	96	–	90	–	65	–	51	–	142	–	44	–	117	–	32	–	89	–	1072	–
Paratyphoid Fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	1	–	2	–	1	–	–	–	6	1
Pellagra	–	1	1	–	–	–	1	1	1	–	1	2	1	2	1	1	1	2	2	2	–	–	–	2	9	13
Rabies	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Scarlet Fever	1028	10	971	8	1208	8	1000	14	1005	11	731	4	270	2	179	4	273	2	479	4	599	6	648	3	8391	76
Septic Sore Throat	16	8	21	5	24	11	18	11	31	4	22	5	16	3	15	4	7	3	17	2	9	1	5	3	201	60
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	372	15	350	12	376	21	389	17	405	10	426	14	291	13	401	9	284	11	404	8	390	17	383	12	4471	159
Tetanus	2	1	–	–	2	2	2	2	–	1	1	2	–	1	6	4	4	3	–	–	–	2	3	2	20	20
Trachoma	12	–	1	–	3	–	2	–	2	–	5	–	1	–	–	–	1	–	2	–	2	–	2	–	33	–
Trichinosis	1	–	4	1	1	1	1	–	2	–	1	1	4	1	1	–	3	–	1	–	14	–	13	–	46	4
Tuberculosis, Pulmonary	297	167	194	157	411	179	258	182	342	207	333	129	280	168	340	148	276	123	319	160	281	133	254	149	3585	1902
Tuberculosis, Other Forms	42	17	31	17	43	28	33	19	38	16	41	19	40	20	40	15	38	15	39	15	33	18	30	15	448	214
Tuberculosis, Hilum	132	–	27	–	130	–	27	–	69	–	42	–	109	–	78	–	35	–	47	–	108	–	51	–	855	–
Typhoid Fever	4	–	9	–	3	1	8	2	7	–	4	1	17	–	24	3	22	2	15	2	10	1	11	1	134	13
Typhus Fever	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	2	–
Undulant Fever	1	–	–	–	1	–	–	–	5	–	2	–	–	–	–	–	1	–	2	–	3	–	–	–	15	–
Whooping Cough	1759	18	1273	9	1969	15	1634	15	1318	10	970	9	930	13	596	8	506	9	411	7	642	3	651	9	12659	125
Total	13866	518	14631	483	17568	536	15921	490	12528	409	9876	274	5588	280	4173	251	3235	230	4073	295	5553	333	6546	341	113558	4440

Cases of Reportable Diseases for 1934 by Ages

Disease	Under 1 Year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	Age Unknown	Total	Male	Female	Unknown
Anterior Poliomyelitis	3	3	3	3	3	4	12	2	4	4	15	11	3	4	–	1	1	–	–	–	–	76	44	32	–
Chicken Pox	294	410	521	653	858	1445	2140	1450	867	518	933	166	61	44	47	30	2	3	–	1	547	10990	5523	5421	46
Diphtheria	7	23	50	66	45	51	44	38	31	17	67	30	33	18	22	23	9	4	4	1	46	629	302	327	–
Dysentery, Amebic	–	–	1	1	2	–	–	–	1	–	1	1	3	–	3	9	3	2	–	1	3	31	18	13	–
Dysentry, Bacillary	3	2	4	6	4	1	2	–	5	4	5	7	19	15	10	35	33	42	26	15	–	238	92	146	–
Epidemic Cerebrospinal Meningitis	9	9	7	3	4	2	2	2	1	–	5	6	5	–	5	3	–	–	–	–	3	66	40	26	–
German Measles	37	46	35	29	39	77	126	106	89	85	252	30	22	6	2	4	2	–	–	–	18	1005	474	531	–
Gonorrhea	24	6	7	14	20	6	8	10	20	20	46	646	1951	1536	900	880	266	69	13	2	94	6538	4842	1681	15
Leprosy	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	3	2	1	–
Lobar Pneumonia	77	108	98	89	97	97	112	86	61	45	180	146	176	156	195	501	493	487	395	159	218	3976	2436	1534	6
Malaria	–	–	–	–	–	–	–	–	–	–	1	2	3	3	4	9	1	–	–	–	4	27	18	9	–
Measles	734	1718	2540	2886	3482	4661	7539	6375	4458	2665	4262	578	228	164	100	75	31	17	9	2	2293	44817	22798	21693	326
Mumps	19	62	91	168	200	374	585	512	413	370	783	179	56	75	60	87	24	10	7	–	235	4310	2240	2057	13
Paratyphoid Fever	–	1	–	–	–	1	–	–	–	–	–	–	1	–	2	–	–	–	1	–	–	6	1	5	–
Pellagra	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	5	1	1	–	–	9	5	4	–
Scarlet Fever	41	138	374	505	644	789	930	793	657	556	1476	406	197	175	129	165	51	12	6	–	347	8391	4147	4205	39
Septic Sore Throat	1	3	5	5	12	9	9	7	5	4	14	8	25	13	15	16	20	7	1	1	21	201	82	119	–
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	21	1	8	6	5	7	8	10	12	15	59	173	499	542	550	1034	841	465	155	22	38	4471	2600	1864	7
Trachoma	–	1	–	1	–	1	–	1	–	1	2	2	3	1	4	6	4	2	1	–	3	33	19	14	–
Tuberculosis, Pulmonary	10	16	9	5	9	8	9	8	13	12	93	273	432	417	367	624	444	324	143	26	343	3585	1989	1596	–
Tuberculosis, Other Forms	5	10	8	9	13	14	6	9	4	4	37	42	40	42	34	54	46	24	11	2	34	448	230	218	–
Typhoid Fever	–	–	5	3	2	5	3	1	1	3	18	15	12	16	13	19	9	9	–	–	–	134	72	62	–
Typhus Fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	2	1	1	–
Undulant Fever	–	–	–	–	–	–	–	–	–	–	–	2	4	–	1	3	4	–	–	1	–	15	10	5	–
Whooping Cough	747	918	1219	1259	1346	1556	1925	1216	678	402	468	58	22	20	16	21	10	7	5	–	766	12659	6079	6452	128

Index to Line Numbers in the Table of Cases of Diseases Dangerous to the Public Health, 1934

Abington	115
Acton	179
Acushnet	138
Adams	67
Agawam	92
Alford	345
Amesbury	65
Amherst	116
Andover	77
Arlington	23
Ashburnham	203
Ashby	272
Ashfield	289
Ashland	189
Athol	69
Attleboro	38
Auburn	98
Avon	184
Ayer	164
Barnstable	84
Barre	146
Becket	303
Bedford	151
Belchertown	158
Bellingham	155
Belmont	31
Berkley	265
Berlin	268
Bernardston	282
Beverly	32
Billerica	105
Blackstone	150
Blandford	301
Bolton	292
Boston	2
Bourne	172
Boxborough	331
Boxford	295
Boylston	261
Braintree	47
Brewster	290
Bridgewater	82
Brimfield	284
Brockton	16
Brookfield	253
Brookline	20
Buckland	245
Burlington	205
Cambridge	5
Canton	118
Carlisle	302
Carver	246
Charlemont	288
Charlton	202
Chatham	198
Chelmsford	94
Chelsea	24
Cheshire	234
Chester	247
Chesterfield	315
Chicopee	22
Chilmark	336
Clarksburg	249
Clinton	68
Cohasset	160
Colrain	256
Concord	90
Conway	285
Cummington	306
Dalton	133
Dana	319
Danvers	59
Dartmouth	83
Dedham	52
Deerfield	170
Dennis	213
Dighton	162
Douglas	201
Dover	251
Dracut	96
Dudley	139
Dunstable	312
Duxbury	221
East Bridgewater	127
East Brookfield	283
East Longmeadow	153
Eastham	304
Easthampton	71
Easton	123
Edgartown	254
Egremont	307
Enfield	332
Erving	260
Essex	239
Everett	17
Fairhaven	72
Fall River	8
Falmouth	126
Fitchburg	28
Florida	335
Foxborough	119
Framingham	37
Franklin	103
Freetown	226
Gardner	45
Gay Head	347
Georgetown	214
Gill	274
Gloucester	34
Goshen	338
Gosnold	351
Grafton	100
Granby	279
Granville	293
Great Barrington	121
Greenfield	54
Greenwich	352
Groton	186
Groveland	193
Hadley	182
Halifax	287
Hamilton	199
Hampden	294
Hancock	340
Hanover	168
Hanson	194
Hardwick	206
Harvard	277
Harwich	181
Hatfield	190
Haverhill	21
Hawley	333
Heath	322
Hingham	101
Hinsdale	257
Holbrook	156
Holden	134
Holland	348
Holliston	167
Holyoke	18
Hopedale	171
Hopkinton	180
Hubbardston	278
Hudson	81
Hull	238
Huntington	276
Ipswich	125
Kingston	173
Lakeville	224
Lancaster	163
Lanesborough	263
Lawrence	12
Lee	137
Leicester	128
Lenox	177
Leominster	40
Leverett	299
Lexington	73
Leyden	337
Lincoln	227
Littleton	243
Longmeadow	122
Lowell	10
Ludlow	80
Lunenburg	207
Lynn	9
Lynnfield	215
Malden	15
Manchester	174
Mansfield	111
Marblehead	79
Marion	209
Marlborough	55
Marshfield	241
Mashpee	313
Mattapoisett	244
Maynard	106
Medfield	135
Medford	14
Medway	161
Melrose	33
Mendon	264
Merrimac	188
Methuen	41
Middleborough	88
Middlefield	346
Middleton	217
Milford	56
Millbury	95
Millis	222
Millville	212
Milton	46
Monroe	334
Monson	127
Montague	87
Monterey	328
Montgomery	353
Mount Washington	355
Nahant	225
Nantucket	136
Natick	58
Needham	66
New Ashford	354
New Bedford	7
New Braintree	317
New Marlborough	291
New Salem	324
Newbury	233
Newburyport	57
Newton	13
Norfolk	232
North Adams	42
North Andover	102
North Attleborough	76
North Brookfield	166
North Reading	195
Northampton	35
Northborough	211
Northbridge	78
Northfield	210
Norton	175
Norwell	236
Norwood	53
Oak Bluffs	250
Oakham	311
Orange	120
Orleans	255
Otis	323
Oxford	142
Palmer	86
Paxton	296
Peabody	39
Pelham	314
Pembroke	240
Pepperell	165
Peru	350
Petersham	300
Phillipston	325
Pittsfield	19
Plainfield	326
Plainville	228
Plymouth	63
Plympton	310
Princeton	297
Provincetown	143

Quincy	11
Randolph	97
Raynham	196
Reading	75
Rehoboth	169
Revere	29
Richmond	305
Rochester	262
Rockland	99
Rockport	157
Rowe	329
Rowley	252
Royalston	298
Russell	267
Rutland	178
Salem	25
Salisbury	183
Sandisfield	321
Sandwich	248
Saugus	51
Savoy	339
Scituate	154
Seekonk	124
Sharon	150
Sheffield	223
Shelburne	237
Sherborn	280
Shirley	185
Shrewsbury	91
Shutesbury	341
Somerset	114
Somerville	6
South Hadley	104
Southampton	281
Southborough	192
Southbridge	62
Southwick	231
Spencer	113
Springfield	4
Sterling	242
Stockbridge	220
Stoneham	74
Stoughton	85
Stow	266
Sturbridge	219
Sudbury	275
Sunderland	271
Sutton	197
Swampscott	70
Swansea	131
Taunton	30
Templeton	140
Tewksbury	112
Tisbury	230
Tolland	349
Topsfield	273
Townsend	229
Truro	309
Tyngsborough	235
Tyringham	342
Upton	200
Uxbridge	108
Wakefield	50
Wales	330
Walpole	89
Waltham	26
Ware	109
Wareham	117
Warren	149
Warwick	320
Washington	344
Watertown	27
Wayland	152
Webster	64
Wellesley	61
Wellfleet	286
Wendell	327
Wenham	258
West Boylston	191
West Bridgewater	159
West Brookfield	259
West Newbury	218
West Springfield	48
West Stockbridge	270
West Tisbury	343
Westborough	107
Westfield	44
Westford	148
Westhampton	316
Westminster	208
Weston	145
Westport	129
Westwood	187
Weymouth	36
Whately	269
Whitman	93
Wilbraham	176
Williamsburg	216
Williamstown	144
Wilmington	132
Winchendon	110
Winchester	60
Windsor	318
Winthrop	49
Woburn	43
Worcester	3
Worthington	308
Wrentham	141
Yarmouth	204
Tewksbury State Infirmary	356
Out of State	357

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1934	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
1	Massachusetts	4,339,210	1	76	5	10990	629	8863	31	238	35	66	1005	6538
	CITIES OF OVER 500,000													
2	Boston	782,518	1	8	–	2997	114	3027	4	10	6	13	103	2380
	CITIES OF OVER 150,000	*355,715*	–	*5*	–	*1066*	*26*	*640*	*11*	–	*2*	*8*	*411*	*494*
3	Worcester	199,180	–	3	–	299	23	331	11	–	–	2	11	190
4	Springfield	156,535	–	2	–	767	3	309	–	–	2	6	400	304
	CITIES OF 100,000–150,000	528,619	–	8	1	1693	156	1135	4	1	2	8	207	907
5	Cambridge	108,523	–	3	–	720	14	412	1	–	–	2	16	232
6	Somerville	108,040	–	–	–	147	54	154	–	1	–	3	7	171
7	New Bedford	106,732	–	3	–	99	27	80	1	–	1	–	168	194
8	Fall River	103,646	–	1	–	228	29	157	2	–	1	3	6	190
9	Lynn	101,678	–	1	1	499	32	332	–	–	–	–	10	120
	CITIES OF 50,000–100,000	*733,910*	–	*18*	–	*1516*	*136*	*1208*	*3*	*10*	*11*	*10*	*62*	*969*
10	Lowell	91,729	–	1	–	92	76	174	–	–	1	1	3	223
11	Quincy	82,115	–	1	–	275	13	158	–	2	5	1	11	88
12	Lawrence	77,934	–	1	–	72	4	122	–	2	3	2	–	157
13	Newton	75,660	–	3	–	466	2	83	–	–	–	–	17	61
14	Medford	69,960	–	1	–	115	20	189	1	–	–	–	9	49
15	Malden	63,320	–	2	–	82	12	181	1	1	–	2	1	113
16	Brockton	62,488	–	–	–	176	1	67	1	–	1	1	10	53
17	Everett	53,775	–	3	–	42	4	77	–	4	–	–	6	78
18	Holyoke	53,310	–	3	–	19	–	71	–	–	1	2	3	28
19	Pittsfield	52,045	–	–	–	14	3	36	–	–	–	–	–	64
20	Brookline	51,574	–	3	–	163	1	50	–	1	–	1	2	55
	CITIES AND TOWNS OF 25,000–50,000	*505,674*	–	*8*	*2*	*939*	*78*	*932*	*1*	*4*	1	*4*	*47*	*611*
21	Haverhill	48,268	–	2	1	41	3	90	–	–	–	–	2	128
22	Chicopee	45,664	–	–	–	23	7	33	–	–	–	–	–	44
23	Arlington	45,564	–	–	–	286	10	114	–	1	–	–	16	36
24	Chelsea	44,604	–	–	–	43	14	102	–	1	–	–	1	76
25	Salem	43,800	–	–	1	10	5	18	1	–	–	3	6	60
26	Waltham	43,065	–	–	–	80	3	90	–	–	–	–	2	32
27	Watertown	42,921	–	1	–	225	4	125	–	–	–	–	5	34
28	Fitchburg	38,215	–	–	–	22	3	29	–	–	–	1	2	14
29	Revere	37,733	–	1	–	57	15	100	–	–	–	–	2	53
30	Taunton	35,744	–	–	–	9	3	7	–	1	–	–	–	44
31	Belmont	27,251	–	–	–	122	3	83	–	–	–	–	9	31
32	Beverly	27,125	–	1	–	2	6	66	–	–	–	–	1	50
33	Melrose	25,720	–	2	–	19	2	75	–	1	1	–	1	9
	CITIES AND TOWNS OF 10,000–25,000	*694,848*	–	*15*	*2*	*1519*	*52*	*1100*	*2*	*189*	*9*	*15*	*100*	*585*
34	Gloucester	24,899	–	–	–	4	6	50	–	–	–	–	1	26
35	Northampton	24,580	–	–	–	34	–	28	–	165	–	2	12	34
36	Weymouth	23,960	–	–	–	6	2	36	–	–	–	1	–	16
37	Framingham	23,160	–	2	–	131	4	84	–	–	–	1	–	16
38	Attleboro	22,738	–	–	–	34	3	65	–	–	–	–	–	15
39	Peabody	22,592	–	1	2	13	8	37	–	–	–	3	–	30
40	Leominster	21,550	–	3	–	27	–	12	–	–	–	1	3	6
41	Methuen	21,455	–	1	–	50	1	27	–	–	–	1	–	9
42	North Adams	20,695	–	1	–	2	–	12	–	–	–	1	2	8
43	Woburn	20,332	–	–	–	9	2	15	–	–	–	–	–	10
44	Westfield	20,140	–	–	–	57	–	24	–	–	3	–	–	8
45	Gardner	19,964	–	–	–	15	–	38	–	–	–	–	3	19
46	Milton	19,460	–	–	–	41	1	37	–	–	–	–	7	13
47	Braintree	17,841	–	–	–	40	2	39	–	–	–	–	2	19
48	West Springfield	17,831	–	–	–	–	2	–	–	–	–	–	–	16
49	Winthrop	17,433	–	–	–	36	1	88	–	–	–	–	4	21
50	Wakefield	16,910	–	1	–	13	4	23	–	–	–	–	–	14
51	Saugus	16,361	–	1	–	12	–	–	–	–	–	–	2	20
52	Dedham	16,166	–	–	–	11	–	6	–	1	–	–	–	12
53	Norwood	15,807	–	–	–	4	–	6	–	–	–	–	–	13
54	Greenfield	15,710	–	2	–	70	–	21	–	–	1	–	2	30
55	Marlboro	15,037	–	–	–	41	–	14	–	–	2	–	–	6
56	Milford	14,711	–	–	–	3	–	24	–	1	–	–	10	12
57	Newburyport	14,623	–	–	–	59	–	20	–	–	–	–	4	27
58	Natick	14,190	–	–	–	66	1	–	–	–	–	–	–	18
59	Danvers	13,935	–	–	–	13	2	24	–	19	–	–	3	20
60	Winchester	13,695	–	–	–	29	–	80	–	–	–	1	3	6
61	Wellesley	13,463	–	–	–	237	2	67	–	–	–	–	3	15
62	Southbridge	13,227	–	3	–	11	3	4	1	–	–	1	1	8
63	Plymouth	12,934	–	–	–	26	1	8	–	–	–	–	1	8
64	Webster	12,656	–	–	–	55	–	1	–	–	–	–	14	9
65	Amesbury	12,463	–	–	–	13	–	23	–	–	–	–	–	19
66	Needham	12,420	–	–	–	188	2	63	–	–	–	–	10	9

to the Public Health, 1934—Continued

Leprosy	Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum*	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
3	3976	27	44817	4310	1072	6	9	1	8391	201	4471	20	33	46	3585	448	855	134	2	15	12659	1
–	1292	7	7690	952	561	2	2	–	1594	72	1984	–	8	25	1046	146	123	25	1	2	2477	2
–	*347*	*1*	*1236*	*56*	*104*	–	–	–	*722*	*5*	*330*	–	*1*	*2*	*258*	*24*	*10*	*6*	–	*2*	*1007*	
–	242	–	1101	38	35	–	–	–	559	4	156	–	1	1	155	14	–	1	–	1	632	3
–	105	1	135	18	69	–	–	–	163	1	174	–	–	1	103	10	10	5	–	1	375	4
–	*502*	*1*	*5109*	*619*	*120*	*2*	*1*	*1*	*866*	*7*	*603*	*4*	*2*	–	*550*	*70*	*72*	*26*	*1*	–	*1940*	
–	133	1	2097	286	17	2	–	–	221	3	182	–	1	–	154	12	13	10	–	–	541	5
–	105	–	827	36	5	–	–	–	158	3	114	1	–	–	91	14	8	1	–	–	161	6
–	65	–	709	6	46	–	1	–	197	–	118	1	1	–	113	24	44	9	–	–	190	7
–	101	–	296	13	49	–	–	–	74	1	106	2	–	–	102	13	4	6	–	–	197	8
–	98	–	1180	278	3	–	–	1	216	–	83	–	–	–	90	7	3	–	1	–	851	9
–	*487*	*2*	*7001*	*459*	*213*	–	*1*	–	*1133*	*42*	*541*	*5*	*8*	*5*	*516*	*82*	*226*	*12*	–	*2*	*1939*	
–	62	–	807	13	9	–	1	–	79	16	93	–	–	–	76	14	6	3	–	–	34	10
–	36	1	1971	23	–	–	–	–	217	3	37	–	1	–	78	7	99	3	–	–	209	11
–	20	–	299	7	5	–	–	–	61	–	89	2	2	–	61	13	6	–	–	–	33	12
–	53	–	840	238	3	–	–	–	142	–	35	–	1	–	26	4	3	–	–	1	671	13
–	47	–	720	79	11	–	–	–	158	9	42	1	–	–	43	9	1	–	–	–	249	14
–	57	–	576	6	4	–	–	–	206	7	41	1	3	–	41	10	4	–	–	–	73	15
–	49	–	139	39	172	–	–	–	71	2	75	–	–	2	44	7	43	1	–	–	319	16
–	55	–	280	8	4	–	–	–	63	3	57	–	1	–	52	5	36	2	–	–	52	17
–	59	–	159	14	1	–	–	–	33	–	18	–	–	–	53	2	16	2	–	–	63	18
–	17	–	559	–	1	–	–	–	49	–	26	–	–	–	14	6	12	–	–	1	19	19
–	32	1	651	32	3	–	–	–	54	2	28	1	–	3	28	5	–	1	–	–	217	20
–	*452*	*9*	*6375*	*409*	*35*	*1*	*1*	–	*1744*	*22*	*304*	*2*	*3*	*2*	*347*	*47*	*116*	*19*	–	–	*1307*	
–	51	–	936	181	2	–	–	–	499	2	36	–	2	–	41	4	2	–	–	–	97	21
–	21	–	29	15	2	–	–	–	29	–	14	–	–	–	38	3	4	1	–	–	9	22
–	35	–	831	94	–	–	–	–	75	1	24	–	–	1	23	1	2	1	–	–	371	23
–	46	6	269	5	3	–	–	–	72	1	49	1	–	–	26	9	82	4	–	–	57	24
–	32	–	156	1	3	–	–	–	276	1	16	1	–	–	29	6	1	–	–	–	25	25
–	35	–	305	24	–	–	–	–	144	–	31	–	–	–	37	3	–	1	–	–	79	26
–	40	–	816	32	4	–	–	–	125	6	24	–	–	–	43	6	11	6	–	–	202	27
–	41	–	853	4	5	1	–	–	233	1	8	–	–	–	25	–	7	1	–	–	83	28
–	47	–	304	2	–	–	1	–	51	1	35	–	1	1	27	2	6	1	–	–	43	29
–	8	2	30	8	2	–	–	–	8	3	15	–	–	–	24	6	1	2	–	–	9	30
–	20	1	1095	19	–	–	–	–	59	1	25	–	–	–	8	–	–	1	–	–	242	31
–	44	–	183	–	–	–	–	–	92	5	16	–	–	–	8	3	–	1	–	–	67	32
–	32	–	568	24	14	–	–	–	81	–	11	–	–	–	18	4	–	–	–	–	23	33
3	*492*	*3*	*8442*	*1514*	*22*	–	*2*	–	*1293*	*32*	*350*	*4*	*10*	*6*	*441*	*40*	*252*	*17*	–	*3*	*2138*	
–	7	–	8	–	2	–	–	–	16	–	15	–	8	1	12	–	45	2	–	–	1	34
–	22	1	5	136	2	–	–	–	49	4	10	–	–	–	25	1	–	–	–	–	75	35
–	3	–	202	11	–	–	–	–	62	1	9	–	–	–	13	1	–	–	–	–	25	36
–	15	1	841	4	–	–	–	–	53	1	9	–	–	–	14	2	34	–	–	–	103	37
–	18	–	162	–	1	–	–	–	9	–	13	1	–	–	20	1	–	–	–	–	97	38
–	20	–	137	16	1	–	–	–	234	–	19	–	–	–	17	4	23	–	–	–	35	39
–	37	–	731	–	–	–	–	–	92	–	10	–	–	–	11	1	2	–	–	–	21	40
–	6	–	401	4	–	–	–	–	10	–	5	–	–	–	9	2	–	–	–	–	65	41
–	17	–	9	–	–	–	–	–	17	–	10	–	–	1	6	1	2	–	–	–	–	42
–	9	1	67	16	–	–	–	–	11	1	16	1	1	–	8	1	–	1	–	–	43	43
3	14	–	51	3	–	–	–	–	6	12	5	–	–	–	10	–	–	1	–	–	36	44
–	15	–	222	34	–	–	–	–	39	–	7	–	–	–	16	3	5	1	–	–	13	45
–	10	–	763	12	–	–	–	–	43	2	14	–	1	–	8	1	–	–	–	–	129	46
–	7	–	291	58	–	–	–	–	45	1	10	–	–	–	14	–	–	–	–	–	49	47
–	5	–	1	–	–	–	–	–	13	–	13	–	–	–	4	1	1	–	–	–	–	48
–	13	–	525	3	2	–	–	–	16	–	9	–	–	–	10	–	23	2	–	–	40	49
–	7	–	78	9	1	–	–	–	10	–	15	–	–	–	5	1	2	–	–	–	5	50
–	9	–	97	4	–	–	–	–	29	–	2	1	–	–	5	1	1	–	–	–	42	51
–	4	–	10	5	–	–	–	–	9	–	9	–	–	1	6	1	–	1	–	–	18	52
–	12	–	2	2	1	–	–	–	29	–	11	–	–	–	4	1	–	2	–	–	18	53
–	12	–	21	30	–	–	–	–	8	2	13	–	–	–	4	–	1	–	–	–	175	54
–	5	–	35	1	–	–	–	–	13	–	9	–	–	–	7	–	–	1	–	1	14	55
–	11	–	85	–	–	–	–	–	36	1	4	–	–	–	15	1	28	1	–	–	10	56
–	6	–	861	123	–	–	1	–	9	–	7	–	–	–	7	–	2	1	–	–	33	57
–	8	–	397	5	–	–	–	–	37	1	15	–	–	–	11	1	25	–	–	–	151	58
–	17	–	56	11	1	–	–	–	87	1	8	–	–	–	18	1	16	–	–	–	16	56
–	9	–	94	22	–	–	–	–	7	–	7	–	–	–	8	1	1	1	–	–	139	60
–	5	–	110	137	–	–	–	–	42	1	8	–	–	–	8	4	3	–	–	–	240	61
–	22	–	222	–	2	–	–	–	34	–	8	–	–	–	12	1	4	–	–	1	32	62
–	13	–	436	4	–	–	–	–	12	–	4	–	–	–	4	–	2	–	–	–	54	63
–	6	–	69	2	2	–	–	–	12	–	2	1	–	–	1	1	–	–	–	–	38	64
–	15	–	378	48	–	–	–	–	16	1	4	–	–	–	13	–	1	–	–	–	8	65
–	18	–	183	363	1	–	–	–	40	–	8	–	–	–	16	1	–	–	–	–	117	66

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1934	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
67	Adams	11,996	–	–	–	18	–	7	–	–	–	–	–	5
68	Clinton	11,658	–	–	–	4	–	10	1	–	2	–	–	5
69	Athol	11,590	–	–	–	17	2	8	–	–	–	–	–	5
70	Swampscott	11,525	–	–	–	52	–	44	–	–	–	–	1	5
71	Easthampton	11,099	–	–	–	6	–	–	–	–	–	2	–	8
72	Fairhaven	11,053	–	–	–	19	1	20	–	–	–	–	4	12
73	Lexington	10,892	–	–	–	22	2	1	–	3	–	–	8	9
74	Stoneham	10,884	–	–	–	15	–	28	–	–	1	1	–	4
75	Reading	10,678	–	–	–	4	–	6	–	–	–	–	–	11
76	North Attleboro	10,535	–	–	–	12	–	–	–	–	–	–	–	9
	TOWNS OF 5,000–10,000	*346,540*	–	*8*	–	*722*	*28*	*424*	*4*	–	*2*	*2*	*31*	*258*
77	Andover	9,701	–	1	–	18	1	38	–	–	–	–	–	3
78	Northbridge	9,428	–	–	–	–	1	–	–	–	–	–	–	3
79	Marblehead	9,040	–	–	–	60	–	55	–	–	1	–	–	2
80	Ludlow	8,935	–	–	–	5	2	–	1	–	–	–	–	10
81	Hudson	8,753	–	–	–	1	–	4	–	–	–	–	1	3
82	Bridgewater	8,711	–	–	–	4	1	10	–	–	–	–	4	2
83	Dartmouth	8,570	–	–	–	28	4	18	–	–	–	–	5	6
84	Barnstable	8,535	–	–	–	7	2	23	–	–	–	–	1	15
85	Stoughton	8,493	–	1	–	–	–	4	–	–	–	–	–	9
86	Palmer	8,335	–	–	–	–	1	7	–	–	–	–	–	6
87	Montague	8,170	–	–	–	1	–	6	–	–	–	–	–	5
88	Middleboro	8,162	–	–	–	7	–	4	–	–	–	–	1	6
89	Walpole	7,919	–	2	–	12	–	17	–	–	–	–	–	2
90	Concord	7,834	–	–	–	57	3	22	–	–	–	–	2	6
91	Shrewsbury	7,832	–	–	–	43	–	–	–	–	–	–	–	1
92	Agawam	7,776	–	–	–	1	–	2	1	–	–	–	–	9
93	Whitman	7,455	–	–	–	1	–	–	–	–	–	–	–	2
94	Chelmsford	7,394	–	–	–	2	1	9	–	–	–	–	–	3
95	Millbury	7,393	–	–	–	37	–	16	–	–	–	–	4	4
96	Dracut	7,345	–	–	–	–	3	–	–	–	–	–	–	5
97	Randolph	7,322	–	–	–	2	–	6	–	–	–	–	–	12
98	Auburn	7,179	–	–	–	74	–	19	–	–	–	–	–	2
99	Rockland	7,153	–	–	–	–	–	8	–	–	–	–	–	13
100	Grafton	7,076	–	–	–	–	–	–	–	–	–	1	–	1
101	Hingham	7,076	–	–	–	29	–	21	–	–	–	–	–	7
102	North Andover	7,063	–	–	–	32	–	21	–	–	–	–	1	5
103	Franklin	7,007	–	–	–	7	–	16	–	–	–	–	1	9
104	South Hadley	6,909	–	–	–	–	1	3	–	–	–	1	–	1
105	Billerica	6,698	–	–	–	9	–	1	–	–	–	–	–	1
106	Maynard	6,599	–	–	–	1	–	1	–	–	–	–	–	3
107	Westboro	6,460	–	–	–	–	1	3	–	–	–	–	–	8
108	Uxbridge	6,376	–	–	–	2	–	3	–	–	–	–	2	5
109	Ware	6,331	–	–	–	–	–	–	–	–	–	–	–	7
110	Winchendon	6,221	–	–	–	46	–	2	–	–	–	–	–	4
111	Mansfield	6,177	–	–	–	27	–	11	–	–	–	–	1	4
112	Tewksbury	6,095	–	–	–	–	1	–	–	–	–	–	–	8
113	Spencer	6,064	–	–	–	3	–	7	–	–	–	–	–	4
114	Somerset	5,886	–	–	–	–	–	–	–	–	–	–	–	1
115	Abington	5,868	–	–	–	–	–	–	–	–	–	–	–	1
116	Amherst	5,820	–	–	–	2	–	9	–	–	–	–	1	5
117	Wareham	5,762	–	1	–	21	–	4	–	–	–	–	1	19
118	Canton	5,749	–	–	–	12	1	35	1	–	–	–	–	1
119	Foxboro	5,691	–	1	–	2	1	–	–	–	1	–	–	2
120	Orange	5,552	–	1	–	2	–	–	–	–	–	–	3	4
121	Great Barrington	5,539	–	–	–	153	3	9	–	–	–	–	1	14
122	Longmeadow	5,355	–	–	–	13	–	6	–	–	–	–	1	2
123	Easton	5,273	–	–	–	1	–	4	–	–	–	–	–	7
124	Seekonk	5,246	–	–	–	–	1	–	–	–	–	–	–	–
125	Ipswich	5,212	–	1	–	–	–	–	1	–	–	–	1	6
	TOWNS OF 2,500–5,000	*200,981*	–	*4*	–	*293*	*2*	*214*	*2*	*24*	*2*	*4*	*19*	*177*
126	Falmouth	4,927	–	–	–	49	–	23	–	–	–	1	1	15
127	Monson	4,776	–	–	–	–	–	–	–	–	–	–	–	–
128	Leicester	4,725	–	–	–	–	–	–	–	–	–	–	–	8
129	Westport	4,574	–	–	–	7	–	1	–	–	–	–	–	1
130	Blackstone	4,568	–	–	–	–	–	–	–	–	–	–	–	–
131	Swansea	4,527	–	–	–	–	–	–	–	–	–	–	–	3
132	Wilmington	4,435	–	–	–	5	–	24	–	–	–	–	3	10
133	Dalton	4,326	–	–	–	–	–	–	–	–	–	1	–	2
134	Holden	4,236	–	1	–	44	–	5	–	–	–	–	–	–
135	Medfield	4,233	–	–	–	–	–	6	–	1	–	–	–	5
136	Nantucket	4,120	–	–	–	–	–	11	–	–	–	–	–	3
137	Lee	4,061	–	–	–	4	–	5	–	–	–	–	–	10
138	Acushnet	4,058	–	–	–	–	1	–	–	–	–	–	–	7
139	Dudley	3,990	–	–	–	–	–	–	–	–	–	–	–	1

to the Public Health, 1934—Continued

Leprosy	Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
-	20	-	2	2	-	-	-	-	8	-	1	-	-	-	5	-	2	1	-	-	8	67
-	13	-	56	4	-	-	-	-	22	-	2	-	-	-	10	-	2	-	-	-	9	68
-	13	-	17	8	-	-	-	-	17	-	4	-	-	-	26	-	11	-	-	-	10	69
-	6	-	144	256	5	-	1	-	20	-	6	-	-	-	9	1	-	-	-	-	78	70
-	12	-	2	3	-	-	-	-	29	1	4	-	-	-	13	1	-	-	-	-	5	71
-	5	-	234	1	1	-	-	-	10	-	11	-	-	-	8	1	1	1	-	-	15	72
-	15	-	194	132	-	-	-	-	11	-	4	-	-	3	10	1	-	-	-	-	127	73
-	7	-	98	41	-	-	-	-	15	2	6	-	-	-	3	-	-	1	-	1	36	74
-	3	-	139	4	-	-	-	-	16	-	2	-	-	-	10	-	15	-	-	-	8	75
-	1	-	6	-	-	-	-	-	-	-	2	-	-	-	6	2	-	-	-	-	-	76
-	*168*	*2*	*4121*	*118*	*7*	-	*1*	-	*437*	*10*	*176*	*5*	-	*3*	*195*	*14*	*31*	*21*	-	*3*	*801*	
-	3	-	111	5	-	-	-	-	23	-	4	-	-	-	6	-	1	-	-	-	35	77
-	12	-	1	-	-	-	-	-	14	-	2	-	-	-	4	-	-	-	-	-	-	78
-	4	-	62	6	-	-	-	-	31	-	1	-	-	-	1	2	-	-	-	-	35	79
-	-	-	-	1	-	-	1	-	3	-	4	-	-	-	8	-	-	-	-	-	10	80
-	3	-	2	-	-	-	-	-	25	-	4	-	-	-	1	-	-	1	-	-	5	81
-	6	-	30	-	-	-	-	-	4	-	8	-	-	-	20	-	-	1	-	-	36	82
-	6	-	108	-	5	-	-	-	11	-	1	1	-	1	9	-	-	1	-	-	26	83
-	10	-	292	4	-	-	-	-	6	-	6	-	-	-	2	-	-	-	-	-	31	84
-	1	-	6	1	-	-	-	-	30	-	6	-	-	-	8	1	-	-	-	-	23	85
-	7	-	134	1	-	-	-	-	17	2	5	-	-	-	6	-	-	-	-	-	-	86
-	-	-	-	1	-	-	-	-	22	1	-	-	-	-	4	-	2	1	-	-	5	87
-	3	-	496	-	-	-	-	-	12	-	9	-	-	-	3	1	-	1	-	1	85	88
-	7	-	70	-	-	-	-	-	12	-	4	-	-	-	8	1	-	1	-	-	40	89
-	15	-	71	22	-	-	-	-	17	-	2	-	-	-	4	-	9	-	-	-	37	90
-	3	-	103	38	-	-	-	-	1	-	5	-	-	-	1	-	-	-	-	-	33	91
-	4	-	1	-	-	-	-	-	1	-	4	-	-	-	2	1	-	-	-	-	1	92
-	-	-	17	-	-	-	-	-	2	-	7	-	-	-	6	-	-	-	-	-	1	93
-	1	-	92	-	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	8	94
-	7	-	382	3	-	-	-	-	3	-	3	1	-	-	3	-	-	-	-	-	49	95
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	2	96
-	-	-	53	-	-	-	-	-	9	-	18	-	-	-	6	-	-	-	-	-	13	97
-	2	-	222	6	-	-	-	-	11	1	4	-	-	-	3	1	1	-	-	-	30	98
-	2	-	1	-	-	-	-	-	12	-	3	-	-	-	5	-	-	1	-	-	-	99
-	3	-	-	-	-	-	-	-	-	-	3	-	-	-	1	-	-	-	-	-	-	100
-	1	-	99	7	-	-	-	-	2	-	2	1	-	-	1	1	-	1	-	-	4	101
-	-	-	204	-	-	-	-	-	8	-	3	-	-	1	3	-	-	2	-	-	13	102
-	3	-	183	-	-	-	-	-	5	-	3	-	-	-	2	-	2	-	-	-	16	103
-	3	-	-	-	-	-	-	-	5	-	1	-	-	-	3	-	-	-	-	-	-	104
-	6	-	41	-	-	-	-	-	16	-	1	-	-	-	2	-	-	1	-	-	1	105
-	3	-	7	-	-	-	-	-	3	-	2	-	-	-	6	1	-	-	-	-	1	106
-	1	-	1	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	107
-	4	-	10	1	-	-	-	-	7	-	2	-	-	-	4	1	1	-	-	-	55	108
-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	109
-	-	-	298	1	-	-	-	-	10	-	2	-	-	-	4	-	-	-	-	-	8	110
-	8	-	318	3	-	-	-	-	6	3	-	-	-	-	3	-	1	6	-	-	15	111
-	2	-	54	1	-	-	-	-	-	-	4	-	-	-	3	-	-	1	-	-	-	112
-	3	-	95	-	-	-	-	-	12	-	3	-	-	-	2	-	-	-	-	-	6	113
-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	114
-	-	-	-	-	-	-	-	-	12	-	2	-	-	-	5	-	-	-	-	-	-	115
-	2	-	5	3	2	-	-	-	14	-	5	1	-	-	3	2	-	-	-	1	71	116
-	7	-	192	-	-	-	-	-	16	-	22	-	-	-	6	-	-	-	-	-	5	117
-	-	-	11	-	-	-	-	-	5	-	7	-	-	-	3	1	-	-	-	-	23	118
-	8	2	128	11	-	-	-	-	18	2	2	-	-	-	13	1	-	1	-	-	7	119
-	5	-	4	1	-	-	-	-	13	-	-	-	-	-	8	-	-	-	-	1	6	120
-	3	-	98	1	-	-	-	-	9	-	1	1	-	-	5	-	3	-	-	-	-	121
-	6	-	7	1	-	-	-	-	4	-	2	-	-	1	-	-	-	-	-	-	36	122
-	4	-	53	-	-	-	-	-	2	-	2	-	-	-	2	-	-	-	-	-	20	123
-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	1	-	-	1	-	-	-	124
-	-	-	56	-	-	-	-	-	8	1	-	-	-	-	1	-	11	-	-	-	9	125
-	*94*	*1*	*2306*	*101*	*2*	*1*	-	-	*256*	*3*	*91*	-	-	*3*	*92*	*13*	*11*	*3*	-	*1*	*462*	
-	7	-	130	5	-	-	-	-	5	-	12	-	-	-	7	2	3	-	-	-	27	126
-	-	-	13	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	127
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	128
-	2	-	14	-	-	-	-	-	2	-	3	-	-	-	3	1	-	-	-	-	7	129
-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	130
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	3	-	-	-	-	-	-	131
-	7	-	73	2	-	-	-	-	1	-	7	-	-	-	4	-	-	-	-	-	-	132
-	-	-	-	-	-	-	-	-	4	-	3	-	-	-	2	-	-	-	-	-	-	133
-	-	-	300	3	-	-	-	-	3	-	1	-	-	-	3	-	1	-	-	-	31	134
-	1	-	19	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	135
-	-	-	3	-	-	-	-	-	1	-	2	-	-	-	1	-	-	-	-	-	3	136
-	6	-	24	2	-	-	-	-	4	-	1	-	-	-	1	-	-	-	-	-	17	137
-	2	-	2	-	-	-	-	-	12	-	-	-	-	-	1	1	-	-	-	-	1	138
-	-	-	1	-	-	-	-	-	10	-	1	-	-	-	2	-	-	-	-	-	2	139

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1934	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
140	Templeton	3,988	–	–	–	–	–	–	–	–	–	–	–	2
141	Wrentham	3,893	–	1	–	52	–	10	–	–	–	–	–	–
142	Oxford	3,878	–	–	–	10	–	–	–	–	–	–	1	3
143	Provincetown	3,822	–	–	–	–	–	–	–	–	–	–	–	1
144	Williamstown	3,815	–	–	–	–	–	–	–	–	–	–	–	–
145	Weston	3,693	–	–	–	11	–	17	–	–	–	–	–	–
146	Barre	3,663	–	–	–	19	–	–	–	–	–	–	–	2
147	East Bridgewater	3,629	–	–	–	–	–	3	–	–	–	–	–	3
148	Westford	3,619	–	–	–	–	–	3	–	–	–	–	–	4
149	Warren	3,612	–	–	–	18	–	–	–	20	–	–	–	–
150	Sharon	3,544	–	–	–	–	1	16	1	–	–	–	–	4
151	Bedford	3,525	–	–	–	11	–	4	–	–	–	–	–	1
152	Wayland	3,512	–	–	–	6	–	9	–	–	–	–	–	5
153	East Longmeadow	3,488	–	–	–	2	–	5	–	–	–	–	–	1
154	Scituate	3,455	–	–	–	1	–	1	–	–	–	–	1	5
155	Bellingham	3,452	–	1	–	–	–	3	–	–	–	–	–	–
156	Holbrook	3,414	–	–	–	–	–	6	–	–	–	–	–	2
157	Rockport	3,364	–	–	–	5	–	6	–	–	–	–	–	8
158	Belchertown	3,332	–	–	–	–	–	–	–	3	–	–	–	3
159	West Bridgewater	3,277	–	–	–	1	–	–	–	–	–	1	–	–
160	Cohasset	3,223	–	–	–	8	–	18	–	–	–	–	–	2
161	Medway	3,157	–	–	–	–	–	–	–	–	–	–	–	2
162	Dighton	3,096	–	–	–	–	–	–	–	–	1	–	–	–
163	Lancaster	3,079	–	–	–	–	–	8	1	–	–	–	–	3
164	Ayer	3,078	–	–	–	15	–	2	–	–	–	–	9	1
165	Pepperell	3,040	–	–	–	1	–	–	–	–	–	–	–	–
166	North Brookfield	2,988	–	–	–	–	–	–	–	–	–	–	–	2
167	Holliston	2,903	–	–	–	–	–	2	–	–	–	–	–	–
168	Hanover	2,847	–	–	–	2	–	4	–	–	–	–	1	–
169	Rehoboth	2,843	–	–	–	–	–	–	–	–	–	–	–	1
170	Deerfield	2,814	–	–	–	1	–	–	–	–	1	–	1	4
171	Hopedale	2,812	–	–	–	1	–	2	–	–	–	–	1	2
172	Bourne	2,793	–	–	–	–	–	–	–	–	–	–	–	4
173	Kingston	2,792	–	–	–	–	–	–	–	–	–	–	–	2
174	Manchester	2,746	–	–	–	–	–	–	–	–	–	–	–	2
175	Norton	2,712	–	–	–	–	–	2	–	–	–	–	–	2
176	Wilbraham	2,624	–	–	–	–	–	1	–	–	–	–	–	2
177	Lenox	2,615	–	–	–	1	–	5	–	–	–	–	–	6
178	Rutland	2,614	–	–	–	9	–	1	–	–	–	1	–	2
179	Acton	2,558	–	–	–	6	–	5	–	–	–	–	–	–
180	Hopkinton	2,555	–	–	–	4	–	4	–	–	–	–	1	1
181	Harwich	2,541	–	–	–	–	–	–	–	–	–	–	–	18
182	Hadley	2,511	–	–	–	–	–	2	–	–	–	–	–	2
183	Salisbury	2,509	–	1	–	–	–	–	–	–	–	–	–	10
	TOWNS OF 1,000–2,500	*151,962*	–	*1*	–	*186*	*36*	*140*	–	–	–	*1*	*21*	*125*
184	Avon	2,454	–	–	–	1	–	3	–	–	–	–	–	–
185	Shirley	2,453	–	–	–	–	–	2	–	–	–	–	1	–
186	Groton	2,438	–	–	–	12	–	–	–	–	–	–	–	–
187	Westwood	2,428	–	–	–	3	–	–	–	–	–	–	–	–
188	Merrimac	2,426	–	–	–	2	–	7	–	–	–	–	1	2
189	Ashland	2,295	–	–	–	–	–	–	–	–	–	–	–	1
190	Hatfield	2.289	–	–	–	–	–	2	–	–	–	–	–	3
191	West Boylston	2,281	–	–	–	15	1	2	–	–	–	–	–	–
192	Southboro	2,257	–	–	–	–	–	7	–	–	–	–	–	–
193	Groveland	2,216	–	–	–	4	–	–	–	–	–	–	–	–
194	Hanson	2,198	–	1	–	5	–	–	–	–	–	–	1	5
195	North Reading	2,157	–	–	–	–	–	–	–	–	–	–	–	–
196	Raynham	2,140	–	–	–	–	–	–	–	–	–	–	–	1
197	Sutton	2,130	–	–	–	3	15	5	–	–	–	–	–	1
198	Chatham	2,088	–	–	–	–	–	4	–	–	–	–	–	8
199	Hamilton	2,065	–	–	–	2	1	3	–	–	–	–	2	3
200	Upton	2,055	–	–	–	–	–	2	–	–	–	–	–	1
201	Douglas	2,052	–	–	–	–	–	2	–	–	–	–	–	3
202	Charlton	2,036	–	–	–	–	10	–	–	–	–	–	–	2
203	Ashburnham	2,015	–	–	–	–	–	–	–	–	–	–	–	2
204	Yarmouth	2,014	–	–	–	–	–	4	–	–	–	–	–	2
205	Burlington	1,968	–	–	–	1	–	–	–	–	–	–	–	3
206	Hardwick	1,967	–	–	–	–	–	–	–	–	–	–	–	1
207	Lunenburg	1,963	–	–	–	–	–	3	–	–	–	–	–	–
208	Westminster	1,954	–	–	–	–	–	–	–	–	–	–	–	2
209	Marion	1,948	–	–	–	2	–	4	–	–	–	–	2	2
210	Northfield	1,943	–	–	–	7	–	2	–	–	–	–	–	1
211	Northboro	1,932	–	–	–	–	–	6	–	–	–	–	–	2
212	Millville	1,899	–	–	–	–	–	–	–	–	–	–	–	–
213	Dennis	1,894	–	–	–	–	–	10	–	–	–	–	–	3
214	Georgetown	1,828	–	–	–	1	–	5	–	–	–	–	–	6

to the Public Health, 1934—Continued

Leprosy	Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	140
–	20	–	301	2	–	–	–	–	23	–	1	–	–	–	6	1	1	–	–	–	2	141
–	2	–	10	1	1	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	9	142
–	1	–	–	–	–	–	–	–	3	–	2	–	–	–	4	–	–	–	–	–	6	143
–	8	–	5	–	–	–	–	–	26	–	–	–	–	3	–	–	–	1	–	–	–	144
–	2	–	69	1	–	–	–	–	4	2	–	–	–	–	2	–	–	–	–	–	12	145
–	1	–	157	–	–	–	–	–	1	–	–	–	–	–	3	–	–	–	–	–	17	146
–	4	–	6	–	–	–	–	–	58	–	5	–	–	–	2	–	–	–	–	–	17	147
–	–	–	119	8	–	–	–	–	3	–	1	–	–	–	1	–	–	–	–	–	–	148
–	3	–	87	3	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	2	149
–	–	–	48	1	–	–	–	–	10	–	–	–	–	–	–	–	–	–	–	–	12	150
–	1	–	52	3	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	3	151
–	1	–	33	–	–	–	–	–	1	–	4	–	–	–	1	–	–	–	–	–	29	152
–	2	–	2	1	1	–	–	–	1	–	–	–	–	–	–	–	2	–	–	–	10	153
–	–	–	95	10	–	–	–	–	1	1	1	–	–	–	4	1	–	–	–	–	3	154
–	–	–	6	–	–	–	–	–	1	–	1	–	–	–	1	–	–	–	–	–	–	155
–	2	–	3	–	–	–	–	–	3	–	3	–	–	–	–	1	–	–	–	–	7	156
–	–	–	2	1	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	157
–	3	–	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	2	158
–	–	–	20	1	–	–	–	–	3	–	1	–	–	–	–	1	–	–	–	–	1	159
–	3	1	15	2	–	1	–	–	4	–	1	–	–	–	–	–	–	–	–	–	4	160
–	–	–	5	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	161
–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	2	–	1	–	–	–	–	162
–	3	–	11	5	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	29	163
–	1	–	167	–	–	–	–	–	2	–	–	–	–	–	1	–	1	1	–	1	74	164
–	–	–	124	–	–	–	–	–	6	–	–	–	–	–	3	–	–	–	–	–	1	165
–	–	–	9	9	–	–	–	–	3	–	–	–	–	–	1	–	–	–	–	–	–	166
–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	1	1	–	–	–	–	–	167
–	–	–	4	–	–	–	–	–	–	–	2	–	–	–	4	2	–	–	–	–	46	168
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	169
–	–	–	9	–	–	–	–	–	2	–	3	–	–	–	2	–	1	–	–	–	12	170
–	4	–	38	–	–	–	–	–	14	–	–	–	–	–	–	–	–	–	–	–	13	171
–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	–	172
–	2	–	31	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	–	173
–	–	–	–	–	–	–	–	–	5	–	5	–	–	–	2	1	–	–	–	–	–	174
–	2	–	5	–	–	–	–	–	2	–	1	–	–	–	3	–	–	–	–	–	8	175
–	1	–	6	1	–	–	–	–	1	–	1	–	–	–	1	–	1	–	–	–	1	176
–	–	–	13	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	13	177
–	–	–	70	–	–	–	–	–	1	–	2	–	–	–	10	–	–	–	–	–	2	178
–	1	–	4	–	–	–	–	–	9	–	3	–	–	–	1	–	–	–	–	–	6	179
–	–	–	151	3	–	–	–	–	1	–	2	–	–	–	3	–	–	–	–	–	32	180
–	–	–	–	–	–	–	–	–	–	–	4	–	–	–	1	–	–	–	–	–	–	181
–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	182
–	–	–	47	37	–	–	–	–	2	–	1	–	–	–	2	–	–	1	–	–	–	183
–	*69*	*1*	*2114*	*60*	*6*	–	*1*	–	*271*	*4*	*80*	–	*1*	–	*76*	*7*	*13*	*3*	–	*1*	*406*	
–	2	–	3	2	–	–	–	–	–	–	1	–	–	–	3	–	–	–	–	–	1	184
–	2	–	30	–	–	–	–	–	33	–	1	–	–	–	3	1	–	1	–	–	4	185
–	–	–	118	–	–	–	–	–	6	–	2	–	–	–	1	–	–	–	–	–	2	186
–	–	–	1	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	1	187
–	4	–	201	8	–	–	–	–	2	–	2	–	–	–	3	–	–	–	–	–	–	188
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	189
–	2	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	190
–	–	–	124	–	–	–	–	–	2	–	–	–	–	–	1	–	–	–	–	–	15	191
–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	192
–	–	–	–	–	–	–	–	–	3	–	1	–	–	–	1	–	–	–	–	–	2	193
–	1	–	5	–	2	–	–	–	10	–	2	–	–	–	1	–	–	–	–	–	3	194
–	1	–	37	–	–	–	–	–	–	–	3	–	–	–	–	1	–	–	–	–	–	195
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	1	196
–	3	–	57	–	–	–	–	–	2	–	2	–	–	–	–	–	–	–	–	–	13	197
–	–	–	2	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	13	198
–	–	–	3	–	–	–	–	–	33	–	2	–	–	–	1	–	–	–	–	–	2	199
–	4	–	119	–	–	–	–	–	6	1	–	–	–	–	1	–	–	–	–	–	3	200
–	–	–	1	–	–	–	–	–	1	–	2	–	–	–	3	–	–	–	–	–	6	201
–	2	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	202
–	–	–	61	–	–	–	–	–	5	–	1	–	–	–	2	–	–	–	–	–	–	203
–	2	–	83	–	1	–	–	–	3	–	–	–	–	–	1	–	1	–	–	–	2	204
–	3	–	1	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	205
–	–	–	75	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	206
–	–	–	121	–	–	–	–	–	14	–	–	–	–	–	–	1	–	–	–	–	42	207
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	208
–	1	–	12	–	–	–	–	–	8	–	4	–	–	–	1	–	–	–	–	–	4	209
–	–	–	4	–	1	–	–	–	14	1	–	–	–	–	1	–	–	–	–	–	51	210
–	–	–	126	–	–	–	–	–	2	–	2	–	–	–	–	–	–	–	–	–	–	211
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	212
–	–	–	45	–	–	–	–	–	3	–	–	–	–	–	2	–	4	–	–	–	10	213
–	1	–	3	–	–	–	–	–	–	–	2	–	–	–	3	–	–	–	–	–	3	214

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1934	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
215	Lynnfield	1,812	-	-	-	-	-	-	-	-	-	-	-	1
216	Williamsburg	1,806	-	-	-	2	-	6	-	-	-	-	-	1
217	Middleton	1,746	-	-	-	-	-	6	-	-	-	-	-	2
218	West Newbury	1,727	-	-	-	-	-	-	-	-	-	-	-	3
219	Sturbridge	1,713	-	-	-	-	-	-	-	-	-	-	-	-
220	Stockbridge	1,707	-	-	-	1	-	1	-	-	-	-	-	2
221	Duxbury	1,700	-	-	-	-	-	1	-	-	-	-	-	-
222	Millis	1,698	-	-	-	3	-	18	-	-	-	-	-	1
223	Sheffield	1,679	-	-	-	1	-	1	-	-	-	-	-	-
224	Lakeville	1,676	-	-	-	-	1	-	-	-	-	-	-	1
225	Nahant	1,673	-	-	-	4	1	1	-	-	-	-	1	1
226	Freetown	1,652	-	-	-	-	-	-	-	-	-	-	-	4
227	Lincoln	1,650	-	-	-	-	-	-	-	-	-	-	-	-
228	Plainville	1,638	-	-	-	1	-	2	-	-	-	-	1	-
229	Townsend	1,636	-	-	-	6	-	1	-	-	-	-	-	-
230	Tisbury	1,634	-	-	-	-	-	-	-	-	-	-	-	1
231	Southwick	1,622	-	-	-	-	-	2	-	-	-	-	1	4
232	Norfolk	1,611	-	-	-	-	-	1	-	-	-	-	-	-
233	Newbury	1,610	-	-	-	-	-	-	-	-	-	-	-	-
234	Cheshire	1,575	-	-	-	-	-	-	-	-	-	-	-	-
235	Tyngsboro	1,566	-	-	-	7	1	2	-	-	-	-	-	1
236	Norwell	1,561	-	-	-	-	-	-	-	-	-	1	-	-
237	Shelburne	1,548	-	-	-	-	-	-	-	-	-	-	-	7
238	Hull	1,537	-	-	-	-	-	-	-	-	-	-	-	-
239	Essex	1,516	-	-	-	2	-	-	-	-	-	-	-	-
240	Pembroke	1,500	-	-	-	-	-	-	-	-	-	-	-	-
241	Marshfield	1,498	-	-	-	3	-	-	-	-	-	-	-	2
242	Sterling	1,494	-	-	-	-	1	-	-	-	-	-	-	-
243	Littleton	1,476	-	-	-	1	-	7	-	-	-	-	-	-
244	Mattapoisett	1,455	-	-	-	43	-	3	-	-	-	-	1	-
245	Buckland	1,452	-	-	-	1	-	-	-	-	-	-	-	6
246	Carver	1,440	-	-	-	2	-	1	-	-	-	-	-	5
247	Chester	1,423	-	-	-	-	-	-	-	-	-	-	-	-
248	Sandwich	1,403	-	-	-	2	1	1	-	-	-	-	-	-
249	Clarksburg	1,355	-	-	-	-	-	-	-	-	-	-	-	-
250	Oak Bluffs	1,350	-	-	-	8	-	-	-	-	-	-	-	2
251	Dover	1,322	-	-	-	6	-	-	-	-	-	-	-	1
252	Rowley	1,317	-	-	-	-	-	-	-	-	-	-	-	1
253	Brookfield	1,311	-	-	-	2	-	-	-	-	-	-	-	-
254	Edgartown	1,305	-	-	-	-	-	-	-	-	-	-	-	1
255	Orleans	1,266	-	-	-	5	-	4	-	-	-	-	-	1
256	Colrain	1,250	-	-	-	15	-	2	-	-	-	-	-	2
257	Hinsdale	1,225	-	-	-	-	-	2	-	-	-	-	-	-
258	Wenham	1,224	-	-	-	-	-	-	-	-	-	-	-	-
259	West Brookfield	1,211	-	-	-	1	-	2	-	-	-	-	1	1
260	Erving	1,208	-	-	-	-	-	-	-	-	-	-	-	-
261	Boylston	1,203	-	-	-	-	-	-	-	-	-	-	-	-
262	Rochester	1,170	-	-	-	-	3	-	-	-	-	-	5	5
263	Lanesboro	1,166	-	-	-	-	-	-	-	-	-	-	-	2
264	Mendon	1,166	-	-	-	3	-	1	-	-	-	-	-	3
265	Berkley	1,120	-	-	-	-	-	-	-	-	-	-	-	2
266	Stow	1,108	-	-	-	-	-	-	-	-	-	-	-	1
267	Russell	1,105	-	-	-	-	-	1	-	-	-	-	-	-
268	Berlin	1,075	-	-	-	-	-	-	-	-	-	-	-	1
269	Whately	1,060	-	-	-	-	-	-	-	-	-	-	-	-
270	West Stockbridge	1,055	-	-	-	5	-	-	-	-	-	-	-	2
271	Sunderland	1,053	-	-	-	-	-	-	-	-	-	-	-	-
272	Ashby	1,041	-	-	-	-	-	-	-	-	-	-	-	1
273	Topsfield	1,041	-	-	-	-	1	1	-	-	-	-	4	-
274	Gill	1,034	-	-	-	4	-	-	-	-	-	-	-	-
275	Sudbury	1,004	-	-	-	-	-	-	-	-	-	-	-	3
	TOWNS UNDER 1,000	*38,443*	-	*1*	-	*56*	-	*43*	-	-	-	*1*	*4*	*32*
276	Huntington	987	-	-	-	1	-	-	-	-	-	-	-	-
277	Harvard	983	-	-	-	-	-	5	-	-	-	-	-	2
278	Hubbardston	966	-	1	-	-	-	-	-	-	-	-	-	-
279	Granby	955	-	-	-	-	-	-	-	-	-	-	-	-
280	Sherborn	951	-	-	-	1	-	-	-	-	-	-	-	-
281	Southampton	939	-	-	-	2	-	-	-	-	-	-	-	1
282	Bernardston	932	-	-	-	-	-	-	-	-	-	-	-	1
283	East Brookfield	926	-	-	-	-	-	5	-	-	-	-	-	-
284	Brimfield	918	-	-	-	-	-	2	-	-	-	-	-	1
285	Conway	875	-	-	-	-	-	-	-	-	-	1	-	-
286	Wellfleet	852	-	-	-	-	-	-	-	-	-	-	-	-
287	Halifax	823	-	-	-	-	-	-	-	-	-	-	-	-
288	Charlemont	816	-	-	-	-	-	-	-	-	-	-	-	1
289	Ashfield	815	-	-	-	1	-	2	-	-	-	-	-	2

Leprosy	Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
–	–	–	2	–	–	–	–	–	–	–	1	–	–	–	2	–	2	–	–	1	–	215
–	1	–	25	1	–	–	–	–	7	–	–	–	–	–	1	–	–	–	–	–	–	216
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	217
–	2	–	–	–	–	–	–	–	1	–	2	–	–	–	1	–	–	–	–	–	5	218
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	219
–	–	–	2	–	–	–	–	–	1	–	–	–	–	–	2	–	–	–	–	–	–	220
–	–	–	88	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	221
–	–	–	2	–	–	–	–	–	5	–	3	–	–	–	2	–	–	–	–	–	–	222
–	3	–	17	1	–	–	–	–	4	–	–	–	–	–	1	–	–	–	–	–	14	223
–	1	–	25	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	6	224
–	–	–	6	2	–	–	1	–	1	–	2	–	–	–	–	–	–	–	–	–	12	225
–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	226
–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	227
–	–	–	4	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	2	228
–	1	–	58	1	–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	229
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	230
–	1	–	–	–	–	–	–	–	1	1	1	–	–	–	–	–	–	–	–	–	1	231
–	–	–	1	–	–	–	–	–	7	–	–	–	–	–	–	1	–	1	–	–	–	232
–	–	–	17	1	–	–	–	–	2	–	3	–	–	–	–	–	–	–	–	–	–	233
–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	234
–	1	–	10	–	–	–	–	–	13	–	1	–	–	–	–	–	1	–	–	–	8	235
–	–	–	–	–	–	–	–	–	4	–	1	–	–	–	–	–	–	–	–	–	–	236
–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	1	237
–	1	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	238
–	–	–	19	11	1	–	–	–	3	–	–	–	–	–	–	–	1	–	–	–	–	239
–	–	–	–	–	–	–	–	–	1	–	2	–	–	–	1	–	–	–	–	–	–	240
–	1	–	25	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	7	241
–	1	–	1	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	7	242
–	–	–	147	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	2	243
–	1	–	47	–	–	–	–	–	1	–	3	–	–	–	–	–	–	–	–	–	24	244
–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	3	245
–	–	–	102	–	–	–	–	–	–	–	7	–	–	–	5	–	–	–	–	–	10	246
–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	–	–	–	1	–	–	–	247
–	2	–	40	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	5	248
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	249
–	6	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	2	250
–	–	–	13	13	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	7	251
–	–	–	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	–	252
–	–	–	3	–	–	–	–	–	1	–	2	–	–	–	–	–	1	–	–	–	–	253
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	254
–	–	–	–	–	–	–	–	–	3	–	1	–	–	–	1	–	–	–	–	–	–	255
–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	65	256
–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	2	–	–	–	–	257
–	3	–	–	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	–	258
–	1	–	2	–	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	259
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	260
–	–	–	58	–	–	–	–	–	5	–	–	–	–	–	3	–	–	–	–	–	–	261
–	3	–	6	–	–	–	–	–	2	–	–	–	–	–	4	–	–	–	–	–	11	262
–	–	–	23	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	3	263
–	–	–	54	–	–	–	–	–	1	–	1	–	–	–	1	–	–	–	–	–	–	264
–	1	–	57	4	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	265
–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	266
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	267
–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	268
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	269
–	–	1	6	–	–	–	–	–	1	–	1	–	–	–	2	–	–	–	–	–	–	270
–	–	–	–	1	–	–	–	–	32	–	–	–	–	–	–	–	–	–	–	–	–	271
–	–	–	11	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	21	272
–	–	–	3	–	–	–	–	–	4	1	–	–	–	–	–	–	–	–	–	–	–	273
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	274
–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	1	–	–	–	–	–	–	275
–	*24*	–	*421*	*32*	*2*	–	–	–	*59*	*4*	*12*	–	–	–	*13*	*1*	*1*	*2*	–	*1*	*160*	
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	276
–	–	–	33	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	16	277
–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	278
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	279
–	–	–	26	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	280
–	3	–	6	–	–	–	–	–	11	–	–	–	–	–	1	–	–	–	–	–	3	281
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	282
–	–	–	16	–	–	–	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	283
–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	284
–	–	–	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16	285
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	286
–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	2	–	–	–	–	–	–	287
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	288
–	1	–	7	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	289

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1934	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
290	Brewster	769	–	–	–	–	–	3	–	–	–	–	–	–
291	New Marlboro	758	–	–	–	3	–	–	–	–	–	–	–	2
292	Bolton	735	–	–	–	5	–	–	–	–	–	–	–	–
293	Granville	725	–	–	–	–	–	–	–	–	–	–	–	–
294	Hampden	725	–	–	–	–	–	–	–	–	–	–	–	–
295	Boxford	707	–	–	–	–	–	5	–	–	–	–	–	–
296	Paxton	704	–	–	–	–	–	–	–	–	–	–	–	–
297	Princeton	698	–	–	–	–	–	–	–	–	–	–	–	–
298	Royalston	686	–	–	–	–	–	–	–	–	–	–	–	–
299	Leverett	685	–	–	–	–	–	–	–	–	–	–	–	1
300	Petersham	660	–	–	–	12	–	1	–	–	–	–	–	–
301	Blandford	632	–	–	–	–	–	–	–	–	–	–	–	–
302	Carlisle	613	–	–	–	–	–	–	–	–	–	–	–	2
303	Becket	587	–	–	–	6	–	1	–	–	–	–	–	1
304	Eastham	581	–	–	–	–	–	1	–	–	–	–	–	1
305	Richmond	553	–	–	–	4	–	–	–	–	–	–	–	–
306	Cummington	547	–	–	–	11	–	–	–	–	–	–	–	1
307	Egremont	542	–	–	–	1	–	2	–	–	–	–	–	–
308	Worthington	529	–	–	–	–	–	–	–	–	–	–	–	–
309	Truro	517	–	–	–	–	–	1	–	–	–	–	–	–
310	Plympton	511	–	–	–	–	–	–	–	–	–	–	–	–
311	Oakham	489	–	–	–	–	–	–	–	–	–	–	–	1
312	Dunstable	418	–	–	–	–	–	–	–	–	–	–	1	–
313	Mashpee	412	–	–	–	–	–	–	–	–	–	–	–	–
314	Pelham	404	–	–	–	–	–	–	–	–	–	–	–	–
315	Chesterfield	403	–	–	–	–	–	3	–	–	–	–	–	1
316	Westhampton	403	–	–	–	–	–	–	–	–	–	–	–	–
317	New Braintree	399	–	–	–	–	–	–	–	–	–	–	–	1
318	Windsor	387	–	–	–	–	–	–	–	–	–	–	–	3
319	Dana	378	–	–	–	–	–	–	–	–	–	–	–	–
320	Warwick	371	–	–	–	–	–	1	–	–	–	–	–	–
321	Sandisfield	366	–	–	–	1	–	2	–	–	–	–	–	–
322	Heath	356	–	–	–	–	–	–	–	–	–	–	–	–
323	Otis	350	–	–	–	–	–	2	–	–	–	–	3	–
324	New Salem	339	–	–	–	1	–	–	–	–	–	–	–	–
325	Phillipston	336	–	–	–	–	–	–	–	–	–	–	–	2
326	Plainfield	327	–	–	–	–	–	–	–	–	–	–	–	–
327	Wendell	319	–	–	–	–	–	–	–	–	–	–	–	1
328	Monterey	303	–	–	–	1	–	2	–	–	–	–	–	–
329	Rowe	302	–	–	–	–	–	–	–	–	–	–	–	–
330	Wales	300	–	–	–	–	–	–	–	–	–	–	–	–
331	Boxboro	297	–	–	–	2	–	–	–	–	–	–	–	1
332	Enfield	285	–	–	–	–	–	–	–	–	–	–	–	1
333	Hawley	283	–	–	–	–	–	–	–	–	–	–	–	–
334	Monroe	277	–	–	–	–	–	–	–	–	–	–	–	–
335	Florida	262	–	–	–	–	–	–	–	–	–	–	–	–
336	Chilmark	260	–	–	–	–	–	–	–	–	–	–	–	1
337	Leyden	260	–	–	–	–	–	–	–	–	–	–	–	–
338	Goshen	248	–	–	–	–	–	–	–	–	–	–	–	–
339	Savoy	240	–	–	–	–	–	–	–	–	–	–	–	–
340	Hancock	239	–	–	–	–	–	–	–	–	–	–	–	–
341	Shutesbury	230	–	–	–	–	–	–	–	–	–	–	–	1
342	Tyringham	221	–	–	–	1	–	1	–	–	–	–	–	–
343	West Tisbury	219	–	–	–	–	–	–	–	–	–	–	–	–
344	Washington	218	–	–	–	–	–	3	–	–	–	–	–	1
345	Alford	188	–	–	–	–	–	–	–	–	–	–	–	–
346	Middlefield	178	–	–	–	–	–	–	–	–	–	–	–	–
347	Gay Head	157	–	–	–	–	–	–	–	–	–	–	–	2
348	Holland	137	–	–	–	–	–	–	–	–	–	–	–	–
349	Tolland	126	–	–	–	–	–	–	–	–	–	–	–	–
350	Peru	108	–	–	–	–	–	–	–	–	–	–	–	–
351	Gosnold	107	–	–	–	–	–	–	–	–	–	–	–	–
352	Greenwich	102	–	–	–	3	–	–	–	–	–	–	–	–
353	Montgomery	102	–	–	–	–	–	–	–	–	–	–	–	–
354	New Ashford	75	–	–	–	–	–	–	–	–	–	–	–	–
355	Mount Washington	60	–	–	–	–	–	1	–	–	–	–	–	–
356	Tewksbury State Infirmary	–	–	–	–	3	–	–	–	–	–	–	–	–
357	Out of State	–	–	–	–	–	1	–	–	–	–	–	–	–

There were no cases of Smallpox reported during the year.

*35 cases of gonorrheal ophthalmia.

to the Public Health, 1934—Concluded

Leprosy	Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
–	–	–	2	1	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	14	290
–	–	–	144	9	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	3	291
–	–	–	52	14	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	2	292
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	293
–	–	–	1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	8	294
–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	295
–	–	–	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	296
–	–	–	4	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	297
–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	298
–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	299
–	1	–	3	–	–	–	–	–	3	4	–	–	–	–	–	–	–	–	–	–	6	300
–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	301
–	–	–	1	–	–	–	–	–	9	–	1	–	–	–	–	–	–	–	–	–	–	302
–	4	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	10	303
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	304
–	1	–	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	24	305
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	10	306
–	–	–	6	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	307
–	–	–	–	7	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	308
–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	309
–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	310
–	–	–	2	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	311
–	–	–	48	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2	312
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	313
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	314
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	315
–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	316
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	317
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	318
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	319
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	320
–	1	–	5	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	321
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	322
–	2	–	2	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	14	323
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	324
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	325
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	326
–	1	–	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	327
–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	328
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	329
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	330
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	331
–	2	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	1	–	–	–	19	332
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	330
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	334
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	335
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	336
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	337
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	338
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	339
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	340
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	341
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	342
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	343
–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	344
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	345
–	–	–	1	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	346
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	347
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	348
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	349
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	350
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	351
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	352
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	353
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	354
–	–	–	1	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	355
–	47	–	2	–	1	–	–	–	16	–	–	–	–	–	52	4	–	–	–	–	22	356
–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	357

REPORT OF DIVISION OF FOOD AND DRUGS

HERMANN C. LYTHGOE, *Director*

The Food and Drug Division during the year 1934 has been engaged in the usual routine work relative to the enforcement of the laws pertaining to the sale of milk, food and drugs; the slaughtering laws; the cold storage laws; the bakery law; the mattress law; and the pasteurization law; as well as in the examination of liquors and chemicals submitted by police departments.

The Legislature of 1934 made a change in the ice cream law, which put additional duties upon the Department, including the making of bacteriological standards for ice cream, and providing a penalty for violating such standards.

There was also a change in the law relative to the licensing of dealers in denatured alcohol. The act passed at the special session of the Legislature in 1933 provided, in addition to the usual local license, for a State license. Because of the passage of this act, an additional inspector was requested, which was allowed in the supplemental budget. At the time the budget went through, however, there was a change in the law, which would provide for licensing of preparations containing more than 3 per cent wood alcohol by local boards of health, and, for state-wide purposes, by the Department of Public Health, and the same act provided for the licensing of dealers in denatured alcohol not containing wood alcohol by the local licensing board, and, state-wide, by the Alcoholic Beverage Control Commission. Work in connection with the issuing of these licenses was begun the latter part of the year, shortly after the change in the law went into effect.

The frozen dessert law also provided for licensing of out-of-state dealers who sold ice cream in Massachusetts, the act providing that such dealers must obtain a permit from the Department before they may sell in Massachusetts. As a result of this act, a number of importers of ice cream were duly licensed.

The number of prosecutions was considerably in excess of those of 1933. This large number was due to unusual violations of the oleomargarine law, to the sale of decomposed hamburg steak, etc., and to the sale of confectionery containing alcohol. There was also an unusual number of violations of the mattress law.

There were 16 cases for the sale of milk not of good standard quality, most of which were brought against restaurant keepers who were dispensing partly skimmed milk. There were 5 cases for selling as pure milk certain milk from which a portion of the fat had been removed; and there were 12 cases for the sale of milk containing added water. There was one case for the sale of low standard cream; and 10 cases for representing as pasteurized, certain milk not pasteurized as defined by law. There were 18 prosecutions for violations of the pasteurization law and regulations, 2 prosecutions for violations of the Grade A regulations, and 2 prosecutions for the misbranding of milk.

During the early part of the year there was a violation of the oleomargarine law by the sale of colored oleomargarine as butter. About the time the Department had gathered evidence for prosecution, it was ascertained that the U. S. Department of Agriculture, as well as the Treasury Department, was interested in the cases inasmuch as they involved evasion of taxes as well as violation of the food and drug law.

The oleomargarine was apparently imported in the legal manner and was stored in Boston. It was then removed to some place outside of Boston, where it was colored, and was then distributed to the stores. There were nine prosecutions involving three defendants. Two defendants, one a Massachusetts corporation, paid the penalty; another defendant appealed, and the appealed cases are still pending at the request of the U. S. Attorney. The defendant in these cases testified before the U. S. Courts in a conspiracy case, resulting in the conviction of the conspirators.

Of the cases pertaining to milk and milk products, 9 resulted in a finding of not guilty, and the rest resulted in conviction.

There were 48 cases for the sale of hamburg steak in violation of the law relative to the use of sodium sulphite in meat and meat products. Under this law, sodium sulphite may be used provided the quantity is less than 0.1%, and provided further that each package sold bears upon the outside a statement to that effect. Prosecutions were brought either for not labeling the package or for using excessive quantities of sodium sulphite. In most of the cases where excessive quantities were used, the packages were not labeled. There were 12 cases of a similar nature pertaining to the sale of sausages containing sodium sulphite. There were 2 cases for the sale of sausages containing excessive cereal, and 1 case for the sale of colored sausage. There were 9 cases for the sale of sausages containing lungs, all of which resulted in conviction. The use of this material in sausages is specifically prohibited by statute.

Shortly after the beginning of the fiscal year, the Department received inquiries as to whether or not confectionery containing alcohol could be legally sold. The persons making the inquiries were informed that the repeal of the prohibition law did not affect the special law which had been on the books for about 20 years, prohibiting the sale of confectionery containing a liquid containing more than 1.0% of alcohol.

It was found practically impossible to trace this material to the manufacturer. In many instances the manufacturer was located outside of the State. In a few instances, where he was located in the State, we were able to secure samples upon which to base prosecutions. Most of the cases were therefore brought against the retail vendor, who was fully aware of the character of the material which he was selling. Practically all the newspapers of the State carried news items, stating that the sale of such material was a violation of the law.

Quite a number of confectionery stores bought this material from traveling salesmen, who made deliveries when they solicited orders. In several instances this material was shipped across the State line in the automobile of the salesman. The amount of alcohol in the liquid in this material varied from 1% to 22%; it averaged 12.3%. There were 48 cases, all but 2 resulting in conviction.

The sale of decomposed meat was excessive. There were 103 cases pertaining to hamburg steak, 3 pertaining to kidneys, and 44 pertaining to sausages. There were 5 cases pertaining to false advertising of buttered popcorn, the material used for buttering being other than butter.

The cases for violation of the law pertaining to eggs were somewhat less than during the prior year, due to a smaller number of samples being collected. There were 2 cases for the sale of decomposed eggs; 18 cases for falsely advertising as "Fresh Eggs" certain eggs which were not fresh; 2 cases for misbranding eggs with the word "Fresh"; and 30 cases for selling cold storage eggs without properly marking the container or without displaying the necessary sign. In many instances these cold storage eggs were represented by word of mouth as fresh eggs.

There was 1 case for operating an unsanitary food establishment, and 2 cases for the operation of unsanitary bakeries. There were 3 cases for violations of the ice cream law and 3 cases for the sale of adulterated or low standard drugs. It was necessary to make 1 prosecution for operating a cold storage warehouse without a license. There were 4 prosecutions for violations of the cold storage law. Violations of the mattress law were unusually large. It was necessary to make 34 prosecutions.

A summary of the prosecutions will be found in Table 1.

There were examined 4,928 samples of milk, of which 4,183 were above the legal standard. Of these, 55 samples showed evidence of the removal of cream and 65 contained added water. This is an increase in the percentage of watered milk over the past three years. This should not be construed to mean that more watered milk is being sold throughout the State. It has been the practice to collect milk from stores and milk dealers, and if there were anything suspicious, as pointed out by the analysis, to make further investigation.

During the past ten or twelve years, there has been a decrease in the number of milk dealers, with an increase in the amount of milk sold by the average dealer. In consequence of this practice a small amount of watered milk could get into the mixture and escape detection.

The Department has during the past four or five years been collecting at the pasteurization plants milk for bacteriological examination. During the past year, this procedure was varied by collecting at the same time milk for chemical examination, and in this way the Department found many producers shipping watered milk to the dealers who purchased it. When this was discovered, the inspectors obtained samples directly from the producers for purposes of prosecution. The average quality of the milk in consequence of this change in procedure has been somewhat reduced, although it is materially above that provided by the Massachusetts standard.

The average composition of the 4,777 samples of milk collected by the inspectors was 12.54% solids and 3.96% fat. Excluding the adulterated samples, there were 4,660 samples with an average solids of 12.58% and an average fat of 3.98%. When one considers that the standard for Grade A milk is 4% fat, we realize that the people of this State are getting exceptionally good milk. The standard for total solids is 12%, and the average milk sold exceeds 12.5% in solids.

A summary of these examinations will be found in Tables 2 and 3.

During the year, there were collected 4,102 samples of milk for bacteriological examination, of which 3,338 conformed with all the requirements.

The average quality of the milk is exceptionally good, although not as good as it was a year ago. This difference may be due to the character of the samples collected, and it may be due to market conditions. The certified and pasteurized milk was considerably higher in quality than that obtained a year ago. The geometric mean of these figures for 1933 was 36, and for 1934 was 10. The geometric mean of the bacterial count of the certified milk unpasteurized was 3,734. The Grade A milk was somewhat higher in bacterial count, the geometric mean being 8,315, which, however, is considerably below the 25,000 standard count, and also considerably below the 15,000 standard proposed by the Milk Regulation Board. The count of the pasteurized milk was higher than it should have been, the geometric mean being 26,865. The standard of the Department is 50,000. When compared with the Grade A milk standard, however, this milk is exceptionally good, nearly half the samples being below the Grade A standard of 25,000.

There were only 15 samples of Grade A Massachusetts milk obtained. The geometric mean of the bacterial counts was 38,397. The geometric mean of the counts of the 17 samples collected in 1933 was 14,655. The quantity of Grade A Massachusetts milk sold on the market is relatively small.

There were collected 314 samples of raw milk intended for consumption as such. The geometric mean of the bacterial count was 46,861, which is somewhat higher than last year's figure of 23,625.

The raw milk for Grade A purposes was considerably lower in bacterial count than that obtained in 1933, the figure for 1934 being 16,575, while the 1933 figure was 28,234. The number of samples collected each year was almost the same.

The average count of milk intended for ordinary pasteurized milk was higher than during 1933, the figure for 1934 being 88,701 and for 1933 being 64,334. One reason for this high count was repeated reinspections of milk because of high counts on the first inspection. There was evidently a fear on the part of milk dealers to stop taking milk from dairies having high counts because of Federal Milk Regulation control. One of the dealers stated at a hearing that if he stopped taking milk from those producers delivering milk with a high count, he would have trouble with the Federal Government. He was informed that he could take his choice of action by the Federal Government or action by the State. He was also informed that it was highly improbable that the Federal Milk Control could compel him to accept milk which he could not sell because of the Massachusetts Laws and Regulations. A subsequent investigation of this man's supply showed that in some way, shape or manner he had caused a reduction in the bacteria count of the milk which he was buying.

There have been established in Massachusetts three pieces of apparatus for the pasteurization of milk at high temperature for a short time. Under the Regulations of the Department, made in accordance with the law, milk heated to not less than 160° F. for a period of not less than 15 seconds may be called "Pasteurized Milk." This type of pasteurization has been carefully studied by the U. S. Public Health Service, by the State Board of Health of Pennsylvania, and by the State Health Department of New York, as well as by commercial interests, and it has been found to be as efficient in killing pathogenic bacteria as the low temperature, long time process. The high temperature, short time apparatus is more nearly "fool-proof" than is the other type as it is equipped with automatic control instruments, so that if the temperature of the milk drops below the pasteurization point the milk pump will instantly stop and will not start again until the milk reaches pasteurization temperature.

There have been a number of efficiency studies made upon these three plants, and in nearly all instances it was found that there was an increase in the bacterial count of the milk as the process of pasteurization continued. This was very evident when the raw milk came from a uniformly mixed source. When the raw milk came from a variable source, the efficiency test was performed by taking a sample of the milk either from the dump tank or the pipe line, and, after the lapse of the calculated time, taking another sample of the finished product, these two samples representing the same milk before and after pasteurization. These figures were then plotted on arithmetic logarithmic paper, the time interval being arithmetic. It was found that the two curves had a tendency to approach each other as the time of operation increased.

We have been unable to ascertain the exact cause of this apparent increase in bacteria. We found on a few tests that there was no apparent increase during the entire process. The apparatus in all instances showed an average efficiency of more than 90% in reduction of bacteria. A few studies on the long flow holder of the low temperature, long time pasteurization showed the same peculiarity of increase in bacteria count as the process continued, although with this apparatus there were a few instances where there was practically no increase during the entire pasteurization period.

The milk sold in Massachusetts is bacteriologically of unusually high quality. Of the raw milk going to pasteurization plants, 70% was of Grade A quality bacteriologically, and 80% of this had a count below 500,000, which was the first count established in this State by regulation for the sale of milk to the consumer. There were examined only 314 samples of raw milk intended to be consumed as such, and half of these samples had a count below 50,000, 82% having a count below 300,000.

A summary of the bacteriological examinations will be found in Table 4.

The first inspections after the passage of the frozen dessert law showed that a strict enforcement of the law would result in an improvement in the quality of the ice cream sold in this State. The ice cream plants had for a number of years been operating under licenses issued by local Boards of Health, but the inspections made by the Department after the passage of the new law indicated that the unsanitary conditions of these plants far exceeded in number those found in the pasteurization plants at the time the pasteurization licensing law went into effect.

A short time after the inspections began, the Department received a letter enclosing a copy of a letter sent by another person who was an employee in an ice cream plant. The person writing the Department stated that, if requested, he would give the Department the name and address of the person writing the letter, if such person would be protected. A request was therefore made for permission to utilize this communication in the annual report, and a reply was received stating that this could be done. The statement is as follows:

"One Billion Trillion Bacteria Can't Be Wrong"

"Within recent times there have been published certain papers which have not been entirely complimentary to the ice cream industry—so some of our more learned and ethical dairy experts believed. Since graduating from college, I have been in the employ of a local ice cream concern and some of the practices which I have seen there have been entirely contradictory to the fundamental principles of cleanliness, fair play, and good ice cream making, which a four year training in college has taught me to recognize as such. My limited working experience enables me (in one instance, at least, and where one exists others must) to say that all is not well in the practice of ice cream making and that there is some truth in the papers referred to above.

"My arrival in the ice cream industry was incidental with the fly season. I have seen flies where ice cream is being made thicker in numbers than any gathering of those creatures of filth which soared over a manure heap. And when something was said to the plant manager concerning this disgusting condition (he, too, was a college graduate) he replied that there was nothing much you could do about it. I have seen flies frozen right in the ice cream, then to be consumed by babies, children or invalids who eat ice cream because it is easy on tender stomachs. I have seen people rinse their hands in the same water—containing no soap—where dairy utensils were being "washed." I have seen pipe lines and fittings lined with green, putrified ice cream mix. I have seen ice cream mix that was so old—in fact, just plain lousey—that the odor arising therefrom would cause the aroma of decayed fish to pale to insignificance. And the nauseating odor of the ice cream made from this mix would permeate the hardening room for days. I have seen the plant manager repeatedly thrust the fore or index finger into a can of freshly made stock and obtain an official sample or perhaps a bit of nutriment to alleviate a hunger pang. I have seen a Stillson wrench picked up from the bottom of a vat. The same wrench was covered with a green slime which would indicate that it had been there for weeks—the bottom of a vat apparently being an excellent hiding place, for no one ever looked there. I have seen flies hovering about an open toilet (one toilet for 25 men) and there was nothing to prevent them from taking a little trip upstairs into the ice cream. I have seen a yellowish colored water (color caused because of the dissolved filth contained therein) drip right through from the porous floor above into the open taps of the package filling machines below. I have seen cans (40 quart variety) which contained a small puddle of brown rinse water filled with newly made mix to be shipped out to smaller dealers who did not make their own mix. The inside of the can being consequently seeded with trillions of bacteria—pathogenic or otherwise, and when the health inspector comes around the main parts of the plant were cleaned while the plant manager carefully manœuvered the inspector about—tactfully avoiding those places most in need of a thorough inspection. I have seen men from every walk of life helping themselves at the freezer to ice cream, and this heterogeneous group included the cop on the beat who was especially fond of the rum which was—or was not—used in making frozen pudding. Lack in discipline invariably co-exists with an utter lack of simple sanitary precautions.

"Poorly tinned vats and coils, foul odors, inadequately cleaned utensils, finger contamination, lack of authority, the ignorance of the employees concerning the importance of their duties as affecting the cleanliness of the finished product. These were every day occurrences. The sin in sanitation which was committed in the name of ice cream making prompts me to state that much can be accomplished in the way of producing a better and healthier ice cream than has heretofore been produced."

On October 16, one of the inspectors submitted a report, in part, as follows:

"On first floor, all pipe lines dirty. Green deposits on all couplings and valves. Large 3″ pipes running from first floor up to the bottom of holding tanks with a capacity of 1,000 gallons each very dirty. The green was oozing out of the couplings at the bottom of the second floor. Verdigris in the valves; looked as if they had never been disconnected.

"The pipe lines running from the pasteurizer up and over the cooler covered with verdigris at each coupling. The distributor pipe that goes over the cooler was a great deal worse than the three or four other pipes. Valves and couplings to the pasteurizer covered with dirt and green deposits. Some casein on pasteurizer. The outside of these pipes, valves and couplings and the freezers were as dirty as the inside. Every time I put my hand on any part of the apparatus it came away with a black, greasy dirt with a stale odor. These large pipes running from the first floor to the holding tanks on the second floor where the ice cream mix goes into the freezer had a very foul odor.

"This concern has been in business about 25 years. The pasteurizing man informed me that they sold about 5,000 gallons of ice cream per week. They make all their own mix, using some cream and some butter.

"The utensils in use were not clean. Floors were greasy and the stock room was not properly kept. In my estimation, an ice cream plant could not be any dirtier than this one."

Bacteriological examination of the samples collected showed especially high counts as might be expected. This case resulted in a prosecution and fine.

Another report reads, in part, as follows:

"When I went into the plant, one pasteurizer was half full of ice cream mix to be pasteurized. The pipe lines were all up. First, I had the distributor pipe over the cooler taken down. It contained rotten, decomposed milk products and there were green deposits on the end of each coupling. On the dead end of this pipe, after disconnecting the coupling, I found a half inch of rotten, sour cream or ice cream mix with green deposits and with a very offensive odor. I had the rest of the pipe lines taken down and they contained dirty, green deposits with a sour, offensive odor. The couplings on each pipe contained green deposits and filth.

"There were three vats located in this plant. The one in the middle, No. 2, they claim they use only in the case of an emergency. I had the valves taken out of the bottom of this pasteurizer and the odor was bad. There were also green deposits on them. The foreman admitted that the valves on these pasteurizers had not been taken off for six weeks. He told me he had not taken down the distributor pipe over the cooler for a month.

"All pipe lines, valves and couplings were dirty on the inside and on the outside so that I had to use warm water and soap after this inspection to get the dirt off my hands."

This case resulted in a prosecution and fine.

One plant, located outside of the State, shipped ice cream mix to Massachusetts where it was frozen and sold. An application was made for a permit to ship into the State and a statement was made that the inspector of the town of Brookline had seen the plant and would report it to be satisfactory. A letter was therefore sent to Mr. Ward, the inspector of Brookline, who happened to be in the neighborhood of the plant in question. The letter was forwarded to him from his office and he inspected the plant and made a report similar to those quoted above, and the permit was refused. A short time afterwards we were informed that the place was in conformance with the law and that a Boston inspector was working in that vicinity. The Health Department of Boston was therefore requested to inspect the plant if an inspector were available in that vicinity, and the Boston Health Department reported that the plant was not in conformance with the Massachusetts regulations. Subsequently, the plant in the State where the mix was frozen was investigated and the inspector reported, in part, as follows:

"The ice cream mix is made out of the State and is shipped to the factory in Massachusetts. There are two freezers in this plant of about 20-gallon capacity each. The inlet pipe to each freezer was extremely dirty, green material was oozing out from the threads of the couplings, the paddles which were inside the cylinder could not be taken out and were extremely dirty, as were also the pipe lines, couplings and valves."

This resulted in a prosecution and payment of a fine.

One man was given a hearing for unsanitary conditions and for operating without a license. He stated at the hearing that this was the first inspection ever made of his plant during 25 years and that he had never had a license from the local board of health.

Another man was given a hearing for operating a plant under unsanitary conditions. Included in these conditions was a cylindrical plug of cheese found in the distributor pipe over the cooler. The excuse was that the pipe was cleaned every day, but, owing to the NRA code, the proprietor was unable to control his employees. In cleaning the pipe, it seems that the employee would put a brush into one end of the pipe and push the piece of cheese over to the other end. He would then go to the other end, insert the brush and push the piece of cheese back again.

It should not be assumed that all the plants are in an unsanitary condition. Far from it. Many of the plants inspected are found to be in absolute compliance with the law and regulations. The following report, as far as sanitary conditions are concerned, is characteristic of many of the plants:

"The ice cream mix is at present received once a week from the company's plant located outside of the State. It is carried over the road in jugs but in the summer time it is transported in glass-lined insulated tanks. There is no pasteurization done at the plant but the mix is all pasteurized. The pipes through which the mix passes were clean. There were three holding tanks which were clean as was also the general condition of the plant and the refrigeration room. The product is shipped exclusively in cardboard containers. There were two 80-quart Miller mixers and a Creamery Package freezer."

The samples of frozen desserts obtained at this plant were found to have a low bacteria count.

Under the regulations made by the Department, if a sample of frozen dessert is found with a high bacterial count, a warning letter must be sent to the person responsible for the condition of the article or to the person from whom the article is obtained. Subsequently three samples may be obtained, either on the same day from different lots or on three days during a short period, and if the majority of these samples show a high count, a prosecution may follow. It is surprising to note the difference between the first sample and the samples obtained after a warning letter has been sent. In all but a very few instances the manufacturer has ascertained the cause of the high count and the subsequent samples have been below the maximum bacterial count set by the Department.

Foods Other Than Milk

During the year there were collected and examined 2,647 samples of food other than milk. A summary of the results of these examinations will be found in Table 5.

The 15 samples of butter found adulterated were oleomargarine sold as butter. The 14 samples of buttered popcorn found adulterated or misbranded were treated with material other than butter. The single sample of celery reported adulterated was misbranded as being produced in New England. This sample was collected as a result of a complaint, and we were able to get evidence that the celery was not "native" celery. The 61 samples of adulterated confectionery were so-called "brandy drops."

There were 67 samples of sour cream collected, of which 14 were adulterated. There were 72 samples of cream cheese collected, of which 19 were adulterated. The adulteration in some of these cases was the addition of gelatin or a similar substance for the purpose of increasing the viscosity of the cream, and in the case of cheese for the inclusion of additional quantities of water.

One case was set in the Springfield Court, to be heard in the early part of December. The Department also obtained some cheese containing foreign fat. This cheese was found in a cold storage warehouse and was discovered in the course of investigation to ascertain the source of some of the gelatined cheese on the market. In only one instance was this cheese traced to the responsible person, who was prosecuted and convicted subsequent to the close of the fiscal year.

There were examined a number of samples of flavoring extracts, which were more or less misbranded. In most instances the manufacturers changed the labels to conform with the requirements of the law.

There were 415 samples of frozen desserts examined chemically, only 4 of which were found below the legal standard. The composition of the frozen desserts was above that required by statute. The statute sets a standard of 10% fat, which, however, may be reduced to not less than 8% by the addition of fruit, nuts, chocolate, etc. Fifty per cent of the samples had a fat content varying from 13% to 17%, and 22% of the samples had a fat content varying from 18% to 22%. The average of these samples was 14%. There were 380 samples of frozen desserts examined bacteriologically, of which 295 conformed with the regulations.

The meat products examined consisted of chicken salad, chicken, hamburg steak, kidneys, liver, pigs' feet, pork sausages, and stew beef, there being 1,338 samples in all. A number of these samples were submitted on complaint of local boards of health and individuals. Many of these submitted samples were said to have been responsible for food sickness. The 2 samples of decomposed chickens were submitted by a local board of health, but the chickens had been held for some days after purchase before delivery to the Department. They were decomposed on delivery to the Department.

Approximately 20% of the meat samples were in violation of the law. It is unfortunate that meat dealers will persist in selling meat which should be transferred to the refuse barrel. Many of the hamburg steak samples were made from decomposed meat and sufficient sodium sulphite was added to deodorize it. The inspectors in collecting these samples do not waste the Commonwealth's money upon material which appears to be good, but when the material has an unsatisfactory appearance a purchase is made.

One cause for decomposition in hamburg steak is not the use of poor meat, but the use of an unclean grinder. An inspector recently reported that he went to a store for some hamburg steak, and when he saw the man cut off a good piece of meat he told the proprietor not to grind it as he was an inspector. He then had the machine disconnected and found that it had not been cleaned for some time and contained considerable decomposed meat apparently left over from the prior day. If the inspector had made a purchase, the meat upon analysis would have been found to be decomposed. This condition may possibly account for many explanations given at hearings, that the meat in question had been freshly ground from good meat the morning the purchase was made.

It has been found in a few instances that dealers mix pork with beef in making cheap hamburg steak. One store advertised the material as "Pork and Beef Hamburg Steak." This practice may result in an increase in trichinosis among humans. With but few exceptions, the public is aware that pork must be thoroughly cooked before it is eaten, and consequently there is very little trichinosis. Trichinosis usually occurs among those races that prefer pork uncooked. There is no possible means of inspection which will assure the public that pork is free from trichinosis. If, however, people buy hamburg steak believing it is beef, and the material contains pork, it is liable to be served somewhat rare, and if there are any trichinæ present, there is liability of the development of trichinosis.

There were 5 samples of olive oil collected, of which 2 were found to be adulterated. This collection was made on the complaint of an olive oil dealer that some one was counterfeiting his brand and substituting an inferior oil. These 2 samples resulted in prosecution. The cans were labeled as containing olive oil, when in fact they contained a mixture consisting of cottonseed oil and some olive oil.

Owing to information received at the meeting of the New England Food Officials in the spring, 21 samples of sweet pickles were collected, of various makes, and 5 of these were found to be sweetened with saccharin. These 5 samples were all the product of one concern. There was a prosecution, which resulted in dismissal for lack of jurisdiction. Subsequent to the close of the fiscal year, the case was prosecuted in the correct jurisdiction, resulting in conviction and appeal. The appealed case has been disposed of by the payment of a fine.

In connection with this case, information was received from the U. S. Department of Agriculture that this corporation had, in Western Massachusetts, a large amount of decomposed pickles. The matter was investigated by an inspector, who found reason to confiscate a large quantity of this ill-smelling material. The inspector ascertained that some of this material had been shipped to the plant in Cambridge. A subsequent inspection of the Cambridge plant disclosed the presence of this material. The material at the plant was also confiscated. The Company agreed to take back all the pickles containing saccharin, and in some instances evidence was secured to show that this was done.

The three samples of adulterated pie filling were mince meat containing sodium benzoate, the package not being labeled as required by the regulations. The single sample of adulterated spice was a special spice which was colored with a dye which had not been certified.

During the month of August, 12 samples of whiskey were purchased and were examined in considerable detail to ascertain whether or not the material was properly labeled and to ascertain still further how this material compared with material on sale prior to prohibition. In general the material was properly labeled. There is considerable popular misinformation as to the composition of whiskey and the difference between so-called "pure" whiskey and "adulterated" whiskey. Whiskey contains approximately 99.6% of alcohol and water. The balance consists of color, solid extract, acids, esters, aldehydes, furfural, fusel oil, and, no doubt, some other unidentified substances. It is popularly supposed that when whiskey is aged, the poisonous fusel oil disappears. In fact, when whiskey ages, the poisonous fusel oil nearly doubles, and during the aging process the whiskey develops the acids, esters, aldehydes, and furfural, which is found in the material on the market. The so-called "blend" is a mixture of dilute alcohol, colored and flavored, and it may contain some aged whiskey.

Whiskey is consumed, both for its flavor, and second, for its alcoholic peculiarities. Prior to prohibition, the popular preference was for the so-called "blend" which contained but 45% alcohol, and the demand was much less for the so-called "straight" whiskey, which contained 50% alcohol.

One interesting label claimed that the material was "Straight Whiskey, Bottled in the Fall of 1934." In view of the fact that this whiskey was purchased in August, 1934, we must assume that the fall begins rather early. This whiskey corresponded in composition to aged whiskey, the fusel oil content being very close to that of the average four year old rye whiskey, and the coloring matter was that which is extracted from the charred oak barrel used in aging whiskey. Another whiskey was labeled "Straight Whiskey, Bottled in the Spring of 1934." This corresponded in composition to "straight" whiskey, although the fusel oil content was somewhat lower than the other sample, but corresponded very closely to that of a one year old whiskey. Another whiskey was labeled "Straight Whiskey, Bottled in the Summer of 1934, Aged in Wood 18 Months." This whiskey was apparently diluted with alcohol and was only 93 proof. It was labeled "95 proof." Another sample labeled "Straight Whiskey, Bottled in the Spring of 1934, 93 Proof" was found to be 93 proof, but was colored with caramel and therefore could not be characterized as "Straight Whiskey." The fusel oil content of this sample was the lowest of any.

Another very interesting sample was labeled "Blended Whiskey, 20% Straight Whiskey, Alcohol, Color. Spring 1934. 80% Neutral Spirits. 90 Proof." This was found to be 89.06 proof, and, strange to say, it had the highest fusel oil content of any sample collected, almost equal to the maximum of a four year old whiskey. This material was made from alcohol, color, and flavor, to which a considerable quantity of fusel oil had been added.

Another sample labeled "Straight Whiskey, Distilled in the Spring of 1930, Bottled in Bond, Bourbon, 100 Proof" was found to be 100.78 proof. The fusel oil content corresponded very closely with that of an eight year old whiskey, and the other ingredients indicated the accuracy of the label. All of these samples were tested for the presence of wood alcohol, with negative results.

Examination of Drugs

There were 347 samples collected, of which 25 were found to be adulterated or misbranded. There were 4 samples of Argyrol below the professed standard under which they were sold. Three samples of camphorated oil were low in camphor. One sample of lime water was somewhat deficient in lime and 5 samples of magnesium citrate solution contained magnesium sulphate. One sample of spirit of anise, 8 samples of spirit of nitrous ether, 1 sample of syrup of hydriodic acid, and 2 samples of tincture of iodine were found to be somewhat below the standard. It was found necessary to make only three prosecutions for the sale of low-standard drugs.

The New England Drug Show, at its exposition in Boston, gave some space to the Department for exhibition purposes. The Food and Drug Division collected a number of samples similar in character to those collections made 25 years ago, and a chart was prepared, showing the difference in composition of these articles at the beginning and end of the 25-year period. No comments were made upon the chart. Comments were unnecessary. The pharmacists have apparently cleaned house in the meantime.

The chart exhibited is as follows:

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Are Drugs More Pure Today Than Twenty-Five Years Ago?

In 1909, the State Board of Health collected and examined 889 samples of drugs including

26 samples of camphor liniment, of which 3 were adulterated.
76 samples of olive oil, of which 7 were adulterated.
156 samples of tincture of iodine, of which 23 were adulterated.
63 samples of spirit of camphor, of which 10 were adulterated.
69 samples of spirit of peppermint, of which 22 were adulterated.
49 samples of spirit of anise, of which 23 were adulterated.
4 samples of spirit of nitrous ether, of which 4 were adulterated.
443 total samples, of which 92 or 20.76% were adulterated.

In March, 1934, the Department of Public Health collected and examined
20 samples of camphor liniment, of which none was adulterated.
16 samples of olive oil, of which none was adulterated.
13 samples of tincture of iodine, of which none was adulterated.
14 samples of spirit of camphor, of which none was adulterated.
9 samples of spirit of peppermint, of which none was adulterated.
6 samples of spirit of anise, of which 1 was adulterated.
21 samples of spirit of nitrous ether, of which 1 was adulterated.
99 total samples, of which 2 or 2.02% were adulterated.

A summary of the analyses of drugs will be found in Table 6.

For the enforcement of the mattress law, the Department never had a specific appropriation. A few attempts have been made on the part of the mattress trade and the Boston Better Business Bureau to transfer the work to the Department of Labor and Industries and to make radical changes in the law. At the hearing before the Mercantile Affairs Committee, the Department stated that it had no objection to the transfer and did not comment upon the character of the bill. At the last session of the Legislature, the Mercantile Affairs Committee reported the bill but left the work with the Department of Public Health. When the bill came before the Ways and Means Committee, the Department objected to the construction of the bill. The Ways and Means Committee asked the Department and the proponents of the measure to agree upon a new draft, but the Boston Better Business Bureau declined to agree with the draft submitted by the Department. The Ways and Means Committee therefore reported the original bill, turning the work over to the Department of Labor and Industries. This bill was vetoed by the Governor.

There apparently is a demand on the part of mattress manufacturers for more inspectional service, and, consequently, the Division recommended in the 1935 budget that a request be made for an additional inspector to spend his whole time on this type of work. The Department purchased an ultra violet lamp to be used in this work, which can also be used in other types of laboratory examinations. This lamp has been found to be quite valuable in detecting secondhand material.

There were 41 prosecutions, all but 5 of which resulted in conviction. The penalties imposed by the courts were in some instances quite high. In Springfield, for example, a $200 fine was imposed and was paid.

The Diamond Mattress Company of Woonsocket, Rhode Island, a few years ago shipped some secondhand mattresses into Fall River, labeling them as being filled with new material. The Company declined to come into Fall River to defend the cases and it was necessary to prosecute its customers. Similarly, this Company shipped to Raccicot Brothers of Webster some mattresses labeled as containing new material, which in fact contained secondhand material. The Company declined to come into Massachusetts, and a complaint was entered against Raccicot Brothers. The Company then decided to come into Massachusetts and defend the case, and on January 18, the Company was convicted and fined and the case against Raccicot Brothers was discharged upon recommendation of the Department. The same Company shipped some similar material to a store in New Bedford, and on July 27 came into New Bedford and was again convicted.

The Department has taken the attitude that the manufacturer of mattresses, even if he does buy the filling under a "New Material" label, should be able to ascertain upon inspection whether or not he is getting such material, whereas a person who buys the mattress for sleeping purposes is unable to ascertain the character of the material used for filling. Consequently, the Department has prosecuted the manufacturer wherever possible. It seems, from evidence which the Department has gathered, that the storekeeper is somewhat at fault by his attempts to make the manufacturer furnish him cheaper and cheaper mattresses, at the same time requiring that the mattress bear a label stating that it is filled with new material. At the close of the fiscal year, a change in policy has been seriously considered. It may produce better results, as far as the consuming public is concerned, if in the future the Department prosecutes not the manufacturer but the retail dealer. The retail dealer can very easily open a few mattresses of each shipment and ascertain if the filling corresponds to the label, and if it does, he may then sew up the mattress and sell without any fear of subsequent prosecution.

Many of the mattress violations were secured as the result of complaints both from the consuming public and the Association of New England Bedding Manufacturers. All complaints have been investigated, and, with but few exceptions, the complaints on the part of the consuming public were found to be valid.

Confiscations

The confiscations made by the Department are summarized in Table 7.

Cold Storage

The cold storage warehouses have been licensed and inspected, as usual, during the course of the year, and no serious violations were found in the warehouses. They have been kept in good sanitary condition.

A number of requests were made for extension of time in storage, and if the articles were found to be in proper shape for extension, it was granted. The general business situation has resulted in an increase in the storage of frozen eggs which are used by bakeries. The recent increase in the price of butter has led to a reduction in the storage of butter, and there has been a slight increase in the holdings of storage pork.

A summary of the extensions of time granted on goods in storage, as well as extensions refused, and a record of lots of food ordered removed from storage, will be found in Tables 8, 9, and 10.

Tables 11, 12, 13, and 14 contain the statistics on the amounts of food placed in storage and the amounts of food on hand in storage.

Slaughtering Inspection

The usual routine work of considering nominations for the position of inspector of slaughtering was carried on. Fortunately, most of the towns made renominations, and such persons were automatically approved if the Department found no criticism of their work during the prior twelve months. There were but few violations of the slaughtering laws, 4 of which resulted in prosecution.

Table 15 gives a summary of the inspections and confiscations made by the local inspectors.

Bakeries and Soft Drink Establishments

The work of inspecting bakeries and soft drink plants has been somewhat curtailed because of the increased work in connection with mattresses. A number of bakery inspections were made as the result of complaints, and in many instances the inspections were made at the request of and in company with the local health authorities. Many of the soft drink plants were inspected and were found to be operating in a reasonably sanitary manner.

In one city the plants were found to be operating without a license. They were clean, and immediately the proprietors went to the board of health for licenses. The inspector called upon the health officer, who inquired as to what he should do. He asked if he were supposed to request these persons to secure their licenses. The inspector told him it would be an act of courtesy to send a request either to renew the license or to close the plant. About twelve months prior to this visit, the same inspector had found one of these plants operating under extremely unsanitary conditions. He also found that it had been operating for a period of two years without a license. This case resulted in prosecution and conviction.

Silver Polish

A few years ago, the owners of hotels and high-grade restaurants agreed with the Department to stop the use of cyanide as a silver cleaner. As a result of this, the Department agreed not to propose any legislation to stop the practice. Once each year, the character of the silver polish used by these places had been investigated, and during the past year the restaurants and hotels were found not to be using any cyanide cleaner.

Liquor Samples

The number of liquor samples submitted by the Police Departments has been materially reduced. A summary of these examinations will be found in Table 16. This naturally left more time on the hands of the employees doing this type of work, and consequently, the chemist was put on bacteriological work, which resulted in an increased examination of milk and ice cream for bacteria. The clerk engaged in that work was given charge of the files connected with the new ice cream law and the new alcohol licensing law, so that apparently it will be unnecessary to employ additional clerical and laboratory service for this work. The wood alcohol licensing law has also resulted in an increased examination of commercial products for the presence of wood alcohol.

TABLE I. — *Prosecutions for Violations of the Food and Drug Laws*

NAME	ADDRESS	COURT	DATE	RESULT
For Sale of Milk not of Good Standard Quality				
Berry, Mazie	Salisbury	Amesbury	Aug. 24, 1934	Conviction [1]
Chaffin, Winslow	Brookfield	East Brookfield	June 8, 1934	Conviction
Chapin, George	Salisbury	Amesbury	Aug. 24, 1934	Conviction
Denosky, Adam	Lincoln	Concord	Aug. 1, 1934	Conviction
Deon, Rosa	Brookfield	East Brookfield	Aug. 3, 1934	Conviction
Doyle, James	Dalton	Pittsfield	Jan. 5, 1934	Conviction
Duffy, Charles J.	Leicester	Worcester	June 15, 1934	Conviction
Georgian Cafeteria, Inc.	Cambridge	Cambridge	Feb. 6, 1934	Conviction
Hill, Catherine	Concord	Concord	Aug. 1, 1934	Conviction
Hillside Dairy, Inc.	Marlboro	Natick	Apr. 11, 1934	Discharged
Joaquin, John	Fall River	Fall River	Feb. 27, 1934	Conviction
McManus, James H., Inc.	Concord	Concord	Aug. 1, 1934	Conviction
Ritchie, Agnes	Oxford	Webster	Aug. 2, 1934	Conviction
Ryan, Joseph W.	Charlton	Southbridge	Aug. 8, 1934	Conviction
Taylor, John C.	Bedford	Concord	Dec. 10, 1933	Conviction
Woodland, Charles L.	Watertown	Waltham	Nov. 13, 1934	Conviction
For Sale of Milk from which a Portion of the Cream Had Been Removed				
Beaubieu, Nelson	Montague	Greenfield	July 6, 1934	Conviction
Grechel, Eva	Ashfield	Greenfield	May 17, 1934	Conviction
Hillside Dairy, Inc.	Marlboro	Newton	May 2, 1934	Conviction
Lemothe, Joseph	Mendon	Blackstone	July 3, 1934	Discharged
Tanner, Ralph	Clarksburg	North Adams	Feb. 8, 1934	Conviction
For Sale of Milk Containing Added Water				
Antoski, Stanley	Ludlow	Springfield	Nov. 2, 1934	Conviction
Bray, Charles	Marlboro	Westboro	Sept. 24, 1934	Conviction
Crane, James B.	Leominster	Leominster	Aug. 31, 1934	Conviction
Diani, Frank	Holliston	Framingham	May 31, 1934	Conviction
Dimock, Edgar S.	Oxford	Webster	April 17, 1934	Conviction
Hagopian, Peter	Marlboro	Westboro	Sept. 24, 1934	Conviction
Kareta, Andrew	Ludlow	Springfield	Nov. 2, 1934	Conviction
Malmosky, Stanley	Bellingham	Framingham	May 31, 1934	Conviction
Oliver, Jesse	South Westport	New Bedford	Oct. 2, 1934	Conviction
Porter, George	Deerfield	Greenfield	July 27, 1934	Conviction
Trahan, Eugene	Westhampton	Northampton	April 10, 1934	Conviction
Vigneault, Arthur	Haverhill	Haverhill	Oct. 30, 1934	Conviction
For Sale of Low Standard Cream				
Woodland, Charles L.	Newton	Newton	Jan. 22, 1934	Conviction
Selling Unpasteurized Milk as Pasteurized				
Bascombe, Ernest	Fall River	Fall River	Feb. 28, 1934	Conviction
Bookless, Max	Pittsfield	Pittsfield	June 5, 1934	Conviction
Burkinshaw, Chester A.	Salem	Salem	Nov. 14, 1934	Conviction
Dennehy & Sons, T.	Quincy	Quincy	May 31, 1934	Discharged
Goldman, Morris	Chelsea	Chelsea	June 1, 1934	Discharged
Harnisch, Ernest	Methuen	Methuen	May 7, 1934	Conviction
Lavoie, Napoleon	Lowell	Lowell	April 6, 1934	Conviction
Miller, Fred	Methuen	Methuen	May 7, 1934	Conviction
Rabinovitz, Arthur	Chelsea	Chelsea	June 15, 1934	Discharged
Rheault, David	Lowell	Lowell	Sept. 4, 1934	Conviction
For Violation of Pasteurization Law and Regulations				
Atwell, Russell	Norton	Attleboro	July 17, 1934	Conviction
Brox, Abraham	Dracut	Lowell	Sept. 4, 1934	Conviction
Davidson & Sons, J.	Chelsea	Chelsea	June 1, 1934	Discharged
Dennehy & Sons, T.	Quincy	Quincy	May 31, 1934	Conviction
Farrell, William C.	Lowell	Lowell	April 6, 1934	Conviction
Goldman, Morris	Chelsea	Chelsea	June 1, 1934	Discharged
Harnisch, Ernest	Methuen	Methuen	May 7, 1934	Conviction
Holder, Herman	Berlin	Clinton	April 5, 1934	Conviction
McAdams & Bros., J. F.	Chelsea	Chelsea	June 1, 1934	Conviction
Miller, Elwood	Seekonk	Taunton	July 23, 1934	Conviction
Monson Milk Co., Inc.	Monson	Palmer	Mar. 9, 1934	Conviction
Olivera, Claudino	Seekonk	Taunton	July 23, 1934	Conviction
Rheault, David	Lowell	Lowell	Sept. 4, 1934	Conviction
Richardson, Hazen K.	Middleton	Salem	Aug. 24, 1934	Conviction
Steele, Robert	North Adams	North Adams	Mar. 16, 1934	Conviction
Stetson, Lincoln	Abington	Abington	Oct. 4, 1934	Conviction
Swartz, Jennie	Chelsea	Chelsea	June 1, 1934	Discharged
United Farmers Co-op. Creamery Assn., Inc.	Everett	Malden	Oct. 4, 1934	Conviction

[1] Appealed; Nol Prossed by District Attorney.

For Violation of Grade A Regulations

Hillside Dairy Co., Inc.	Marlboro	Hudson	Oct. 31, 1934	Conviction
Kirschner, Joseph W.	Pittsfield	Great Barrington	June 6, 1934	Conviction

Misbranding of Milk

Alta Crest Farms, Inc.	Spencer	East Brookfield	Aug. 10, 1934	Discharged
Wells, Frederick U.	Whately	Greenfield	Aug. 9, 1934	Conviction [1]

BUTTER

(Sale of Rancid Butter)

Wyman, Wilbur	Boston	Boston	June 20, 1934	Discharged

For Violation of Oleomargarine Law

Chapin & Adams Corp.	Boston	Boston	June 6, 1934	Conviction
Leger, Albert A.	Fall River	Fall River	June 21, 1934	Conviction
Leger, Albert A.	Fall River	Fall River	June 21, 1934	Conviction
Leger, Albert A.	Fall River	Fall River	June 21, 1934	Conviction
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]
Ryan, James W.	Boston	Boston	May 22, 1934	Conviction [1]

For Sale of Adulterated or Misbranded Foods Other than Milk and Milk Products

CELERY

(Misbranded)

Lochiatto, Rose	Boston	Boston	Nov. 23, 1934	Conviction
Screnci, Thomas	Boston	Boston	Nov. 23, 1934	Conviction

CHOCOLATE MILK

(Deficient in fat)

Steele, Robert	North Adams	North Adams	Mar. 16, 1934	Discharged

CLAMS

(Sewage Polluted)

Basil, Diana	Quincy	Quincy	Sept. 18, 1934	Conviction [1]
Knight, Frederick	Lynn	Concord	Aug. 10, 1934	Conviction [1]
Lane, Howard	Gloucester	Gloucester	Sept. 27, 1934	Conviction [1]
Naser, Ernest	Quincy	Quincy	Sept. 18, 1934	Discharged
Palmer, H. C.	Harpswell, Maine	Amesbury	June 1, 1934	Conviction
Parker, H. A.	Revere	Ipswich	July 6, 1934	Conviction [1]
Powers, John L.	Lynn	Ipswich	June 7, 1934	Conviction [1]
Savage, Carl, Jr.	Rowley	Boston	Jan. 24, 1934	Conviction
Wright, John	Gloucester	Gloucester	Sept. 27, 1934	Conviction [1]
Wright, John	Gloucester	Gloucester	Sept. 27, 1934	Conviction [1]

DRIED FRUITS

(Contained sulphur dioxide)

Dexter Food Corp.	Holyoke	Holyoke	Mar. 20, 1934	Conviction
Grand Union Stores, Inc.	Williamstown	Williamstown	Dec. 20, 1933	Conviction
Growers Outlet, Inc.	Greenfield	Greenfield	Jan. 18, 1934	Conviction

EGGS

(Misbranded)

Cohen, Harry	Greenfield	Greenfield	Dec. 27, 1933	Conviction
Vigoda, Philip	Brookline	Brookline	Dec. 4, 1933	Conviction

IMITATION VANILLA EXTRACT

(Misbranded)

Brod, Milton	Springfield	Springfield	April 18, 1934	Conviction
Davis, Nathan	Salem	Salem	Feb. 9, 1934	Conviction

HAMBURG STEAK

(Selling, or offering for sale, meat containing sodium sulphite in violation of the regulations of the Department of Public Health)

Berkman, Inc., Samuel R.	Roxbury	Roxbury	Dec. 8, 1933	Conviction

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[1] Appealed

For Sale of Adulterated or Misbranded Foods Other than Milk and Milk Products — Concluded

Hamburg Steak

(Violation of the law relative to use of sodium sulphite in meat and meat products)

Alpert, Archie	Cambridge	Cambridge	May 16, 1934	Conviction
Alpert, Victor	Cambridge	Cambridge	May 16, 1934	Conviction
Andrews, Max	Malden	Malden	Aug. 10, 1934	Conviction
Angilini, Ettore	Fall River	Fall River	July 20, 1934	Conviction [1]
Baker, Max	Roxbury	Boston	Jan. 16, 1934	Conviction
Bornstein, Morris	Boston	Boston	Feb. 20, 1934	Conviction
Charness, Joseph	Cambridge	Cambridge	Dec. 21, 1933	— [2]
Cohen, Samuel	Boston	Boston	Jan. 16, 1934	Conviction
Consumers Provision Stores, Inc.	Worcester	Worcester	July 9, 1934	Conviction
De Luca, Rose	Somerville	Somerville	Jan. 30, 1934	Conviction
Eidelman, Allick	Charlestown	Charlestown	June 12, 1934	Conviction
Eskow, George	Taunton	Taunton	Dec. 12, 1933	Conviction
Freni, John	Boston	Boston	June 7, 1934	Conviction
Goldman, Louis	Lynn	Lynn	April 3, 1934	Conviction
Gordon, Peter	Boston	Boston	July 13, 1934	Conviction
Handler, Alice	Brookline	Brookline	Dec. 4, 1933	Conviction
Horne, Abraham	Cambridge	Cambridge	April 5, 1934	Conviction
Kaufman, Samuel	Chelsea	Chelsea	Feb. 28, 1934	Conviction
Kaufman, Samuel	Chelsea	Chelsea	May 4, 1934	Conviction
Kisiel, August	Ware	Ware	Dec. 7, 1933	Conviction
Kline, Samuel	Lynn	Lynn	May 28, 1934	Conviction
Kresge Company, S. S.	Roxbury	Roxbury	Feb. 9, 1934	Conviction
Krivitsky, Harry	Boston	Boston	Mar. 26, 1934	Conviction
Kronick, Myer	Orange	Orange	Mar. 2, 1934	Conviction
Kummel, Irvin	Boston	Boston	April 17, 1934	Conviction
Leavitte, Harry	North Adams	North Adams	Dec. 6, 1933	Conviction
Levine, Louis	Roxbury	Dorchester	July 13, 1934	Conviction
Neck Market, Inc.	Charlestown	Charlestown	April 3, 1934	Conviction
Needle, Walter	Dorchester	Dorchester	July 13, 1934	— [2]
Needleman, Nathan	Chelsea	Chelsea	Jan. 9, 1934	Conviction
Norwood Provision Co., Inc.	Everett	Malden	Oct. 18, 1934	Conviction
Pasquale, Joseph	Newburyport	Newburyport	Sept. 28, 1934	Conviction [3]
Ring, Harry	Brookline	Brookline	Dec. 15, 1933	Conviction
Rocheleau, Leo	New Bedford	New Bedford	Dec. 18, 1933	Conviction
Rosenberg, Phillip	Dorchester	Dorchester	June 21, 1934	Conviction
Rossman, Edward	Revere	Chelsea	Dec. 19, 1933	Conviction [1]
Ruggieri, John F.	Somerville	Somerville	Dec. 18, 1933	Conviction
Selansky, Harry	Melrose	Malden	Mar. 1, 1934	Conviction
Shavitsky, Millie	Revere	Chelsea	Dec. 7, 1933	Conviction
Simons, Edward	Roxbury	Roxbury	Aug. 7, 1934	Conviction
Smokler, Julius	Boston	Boston	July 13, 1934	Conviction
Swerdlick, Israel	Boston	Boston	Dec. 29, 1933	Conviction
Tallent, Samuel	Springfield	Springfield	Aug. 1, 1934	Conviction
Tillman, Isaac	Springfield	Springfield	May 24, 1934	Conviction
Weinck, Samuel	Roxbury	Roxbury	Oct. 10, 1934	Conviction
Wernick, Abe I.	Brighton	Brighton	July 27, 1934	Conviction
Wolf, Samuel	Boston	Boston	July 13, 1934	Conviction
Zimberg, Samuel	Springfield	Springfield	June 20, 1934	Conviction

Ice Cream

(Low Standard)

Hager, Clayton M.	Somerville	Somerville	Nov. 15, 1934	Conviction

Mince Meat

(Contained benzoic acid)

Big Bear Meat Department, Inc.	Somerville	Somerville	April 12, 1934	Conviction
Growers Outlet, Inc.	Holyoke	Holyoke	April 26, 1934	Conviction

Olive Oil

(Adulterated with foreign oil)

Arena, John	Boston	Boston	April 13, 1934	— [4]
Arena, John	Boston	East Boston	May 8, 1934	Discharged
Borgia, Frank S.	Boston	East Boston	May 8, 1934	Conviction
Borgia, Frank S.	Boston	Boston	April 13, 1934	— [4]
Ruttenberg, Norman	Boston	Boston	July 2, 1934	Conviction

Sausage

(Violation of the law relative to use of sodium sulphite in meat and meat products)

Albertelli, Anthony	Boston	Boston	Feb. 1, 1934	Conviction
Andreottola, Frank	Revere	Chelsea	Jan. 23, 1934	Conviction [1]
Cavigicoti, C.	Milford	Milford	April 23, 1934	Conviction
Chicopee Falls Public Market, Inc.	Indian Orchard	Springfield	June 20, 1934	Conviction
City Provision Co., Inc.	Springfield	Springfield	April 4, 1934	Conviction [3]
Di Sola, Jerry	Somerville	Somerville	Jan. 8, 1934	Conviction
Kudla, Michael	Holyoke	Holyoke	Jan. 31, 1934	Conviction
La Magna, Michael	Cambridge	Cambridge	Mar. 28, 1934	Conviction
Moli, Renzo	East Boston	East Boston	April 13, 1934	Conviction
Moskal, John	Holyoke	Holyoke	Feb. 6, 1934	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Conviction
Zuffante & Co., G.	Boston	Somerville	April 26, 1934	Conviction

[1] Sentence suspended.

[2] Dismissed for want of prosecution.

[3] Appealed.

[4] Dismissed for lack of jurisdiction.

SAUSAGE

(Contained starch in excess of 2 per cent)

Atlantic Provision Co., Inc.	Somerville	Somerville	May 7, 1934	Conviction
Levy, John A.	Lynn	Lynn	April 20, 1934	Conviction

SAUSAGE

(Contained added color)

Balkus Sausage & Provision Company	Lynn	Lynn	May 3, 1934	Conviction

SAUSAGE

(Contained lungs)

Buonanno, Antonio	Lawrence	Lawrence	Mar. 5, 1934	Conviction
De Rosa, Charles	Boston	Boston	Mar. 7, 1934	Conviction
Fried, Joseph	Boston	Boston	Mar. 12, 1934	Conviction
Gibson, Abraham	Boston	Boston	Feb. 28, 1934	Conviction
Imperali, Italo	Boston	Boston	Mar. 14, 1934	Conviction
Peluso, Dominick	Lawrence	Lawrence	Feb. 26, 1934	Conviction
Reinholtz, Joseph	Boston	Boston	Feb. 28, 1934	Conviction
Savastano, Cresenzo	Lawrence	Lawrence	Mar. 5, 1934	Conviction
Serena, Peter	Boston	Boston	Mar. 7, 1934	Conviction

SWEET RELISH

(Contained saccharine)

Harvard Pickle Works, Inc.	Cambridge	Malden	Nov. 8, 1934	–[1]

For Sale of Confectionery Containing More than One Per Cent of Alcohol

Anderson, William C.	Worcester	Worcester	Feb. 19, 1934	Conviction
Azer Drug Company	Chelsea	Chelsea	Jan. 23, 1934	Conviction
Ballos, Arthur	Worcester	Worcester	Feb. 19, 1934	Conviction
Bay State Drug Co., Inc.	Palmer	Palmer	Mar. 9, 1934	Conviction
Becrelis, George	Leominster	Leominster	Feb. 13, 1934	Conviction
Berger, David	Worcester	Worcester	Feb. 19, 1934	Conviction
Bernstein, William	Springfield	Springfield	Feb. 21, 1934	Conviction
Bezreh, Nicholas	Cambridge	Cambridge	Feb. 5, 1934	Conviction
Bozicas, Stephen A.	Fitchburg	Fitchburg	Feb. 12, 1934	Conviction
Connolly, Edward J.	Lynn	Lynn	Feb. 2, 1934	Conviction
Dimodica, Vincent J.	Boston	Boston	Feb. 8, 1934	Conviction
Doll, Joseph	Malden	Malden	Jan. 25, 1934	Conviction
Dounelis, Charles	Salem	Salem	Jan. 24, 1934	Discharged
Enright, Harold	Fitchburg	Fitchburg	Feb. 12, 1934	Conviction
Fins, Morris	Salem	Salem	Jan. 24, 1934	Conviction
Forbes & Wallace, Inc.	Springfield	Springfield	Feb. 21, 1934	Conviction
Galvanus, Peter	Salem	Salem	Jan. 24, 1934	Discharged
Gaudette, Leo	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Giard, Edmourd J.	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Gilman & Moffet Co.	Worcester	Palmer	Mar. 9, 1934	Conviction
Greenberg, Maurice	Malden	Malden	Jan. 25, 1934	Conviction
Greenburg, Samuel	Springfield	Springfield	Feb. 20, 1934	Conviction
Gretsky, Henry	Chelsea	Chelsea	Jan. 29, 1934	Conviction
Hamilton, John	Worcester	Worcester	Feb. 19, 1934	Conviction
Jonas, Abraham	Worcester	Worcester	Mar. 9, 1934	Conviction
Kramer, Morris	Cambridge	Cambridge	Feb. 16, 1934	Conviction
Livingston, Benjamin	Roxbury	Boston	Feb. 15, 1934	Conviction
Livingston, Benjamin	Roxbury	Boston	Feb. 15, 1934	Conviction
Madden, Martin W.	Worcester	Worcester	Mar. 9, 1934	Conviction
Milne, Ida	Salem	Salem	Jan. 30, 1934	Conviction
Murphy Company, Eugene J.	Fitchburg	Fitchburg	Feb. 12, 1934	Conviction
Nemrow Bros., Inc.	Springfield	Springfield	Feb. 20, 1934	Conviction
Pallas, George	Worcester	Worcester	Feb. 19, 1934	Conviction
Piageneni, Louis	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Poulos, George	Lynn	Lynn	Jan. 18, 1934	Conviction
Roth, Murray	Dorchester	Boston	Feb. 15, 1934	Conviction
Roth, Murray	Dorchester	Boston	Feb. 15, 1934	Conviction
Sherman, Harry	Dorchester	Cambridge	Mar. 14, 1934	Conviction [2]
Shiff, Louis M.	Springfield	Springfield	Feb. 20, 1934	Conviction
Soldani, Gerolamo	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Starr, David	Boston	Boston	Mar. 7, 1934	Conviction
Stathis, Nicholas	Springfield	Springfield	Feb. 20, 1934	Conviction
Viteralli, Edward	Springfield	Springfield	Feb. 20, 1934	Conviction
Wilson, Walter E.	Worcester	Worcester	Feb. 19, 1934	Conviction
Winthrop, Phillip	Brookline	Fitchburg	Mar. 29, 1934	Conviction
Woodward, Seymour	Boston	Boston	Jan. 8, 1934	Conviction
Woodward, Seymour	Boston	Boston	Jan. 8, 1934	Conviction
Yakubowska, Mary	Salem	Salem	Jan. 30, 1934	Conviction

[1] Dismissed for lack of jurisdiction.

[2] Guilty; placed on probation for 1 year

For Sale of Decomposed Food

EGGS

Rabinowitz Delicatessen & Lunch Company	Roxbury	Roxbury	Aug. 7, 1934	Conviction
Santos, Frank	Cambridge	Cambridge	Dec. 7, 1933	Conviction

HAMBURG STEAK

Alpert, Victor	Cambridge	Cambridge	Dec. 21, 1933	Conviction
Andrews, Max	Malden	Malden	Aug. 10, 1934	Conviction
Atlantic & Pacific Tea Co., Great	Pittsfield	Pittsfield	Dec. 28, 1933	Conviction
Barron, Benjamin L.	Cambridge	Cambridge	Jan. 2, 1934	Conviction
Barron, Robert L.	Boston	Boston	July 13, 1934	Conviction
Beaudry, Alexander	Lowell	Lowell	Feb. 14, 1934	Conviction
Bellanger, Harry	Indian Orchard	Springfield	June 20, 1934	Conviction
Blood Company, J. B.	Malden	Malden	Aug. 10, 1934	Discharged
Brock, Harry	Roxbury	Roxbury	Dec. 8, 1933	Conviction
Brockelman Bros., Inc.	Worcester	Worcester	Dec. 15, 1933	Conviction
Cambridge Provision Co.	Cambridge	Cambridge	May 1, 1934	Conviction
Clebnik, Israel	Lynn	Lynn	June 11, 1934	Conviction
Cohen, Samuel	Boston	Boston	Jan. 16, 1934	Conviction
Cohen, Samuel	Boston	Boston	May 31, 1934	Conviction
Consumers Provision Stores, Inc.	Worcester	Worcester	July 9, 1934	Conviction
Consumers Provision Stores, Inc.	Worcester	Worcester	July 9, 1934	Conviction
Corey, Arthur	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Corey, Arthur	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Curley, Samuel	Lowell	Lowell	Sept. 27, 1934	Conviction
Curley, Samuel	Lowell	Lowell	Sept. 27, 1934	Conviction
Dee, William	Roxbury	Roxbury	Dec. 8, 1933	Conviction
Economy Grocery Stores	Revere	Chelsea	Mar. 20, 1934	Conviction [1]
Empire Beef Company	Worcester	Worcester	Dec. 15, 1933	Conviction
Empire Beef Company	Worcester	Worcester	Dec. 15, 1933	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Fairburn's Market, Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Fairburn's Market, Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Ferman, Sarah	Milford	Milford	Dec. 13, 1933	Conviction
Filialt, Aurila	Springfield	Springfield	June 20, 1934	Conviction
Fishman, Nathan	Allston	Brighton	Jan. 9, 1934	Conviction
Foster, Maurice	Cambridge	Cambridge	Jan. 22, 1934	Conviction
Ganem, William	Lawrence	Lawrence	Aug. 28, 1934	Conviction [2]
Ganem, William	Lawrence	Lawrence	Aug. 28, 1934	Conviction [2]
Gaudreault, Arthur	Lowell	Lowell	Feb. 14, 1934	Conviction
Gerogosian, John	Somerville	Somerville	Dec. 26, 1933	Conviction
Gillis, Harry	Boston	Boston	May 29, 1934	Conviction
Ginsberg, Israel	Chelsea	Chelsea	Mar. 20, 1934	Conviction [3]
Goldman, Lewis	Lynn	Lynn	Dec. 21, 1933	Conviction
Goodfader, Morris	Boston	Roxbury	Feb. 14, 1934	Conviction
Goodfader, Morris	Roxbury	Roxbury	July 17, 1934	Conviction
Gordon, Joseph	Lowell	Lowell	Sept. 27, 1934	Conviction
Gordon, Milton	Waltham	Waltham	July 11, 1934	Conviction
Gordon, Peter	Boston	Boston	July 13, 1934	Conviction
Hodes, Samuel	Worcester	Worcester	July 3, 1934	Conviction
Holland, Abraham	New Bedford	New Bedford	Dec. 18, 1933	Conviction
Hollis ,Frank	Chelsea	Chelsea	April 4, 1934	Discharged
Kessler, Keve	Malden	Malden	Aug. 10, 1934	Conviction
Kline, Samuel	Lynn	Lynn	May 28, 1934	Conviction
Kramer, Harry	Hudson	Hudson	Oct. 31, 1934	Conviction
Kravitz, Robert	New Bedford	New Bedford	Dec. 18, 1933	Conviction
Lampert, Harold	Somerville	Somerville	Mar. 29, 1934	Conviction
Levy, Dave	Boston	Roxbury	Oct. 26, 1934	Conviction
Levy, Jack	Lynn	Lynn	Dec. 21, 1933	Conviction
Levy, John A.	Chelsea	Chelsea	Mar. 30, 1934	Discharged
Levy, John A.	Lynn	Lynn	April 20, 1934	Conviction
Levy, John A.	Lynn	Lynn	Nov. 20, 1934	Conviction
Mades Company, Inc., M. M.	Malden	Malden	Feb. 2, 1934	Conviction
Mades Company Inc., M. M.	Lynn	Lynn	April 12, 1934	Conviction [4]
Main Street Market, Inc.	Springfield	Springfield	June 20, 1934	Conviction
Mencis, Bert	Haverhill	Haverhill	Sept. 6, 1934	Conviction
Miller, Abraham	New Bedford	New Bedford	Dec. 18, 1933	Conviction
Moro, E.	Milford	Milford	April 6, 1934	Conviction
Most, Max	Boston	Boston	July 13, 1934	Conviction
Neck Market, Inc.	Charlestown	Charlestown	April 3, 1934	Conviction
Neck Market, Inc.	Charlestown	Charlestown	June 6, 1934	Conviction
Needle & Davis, Inc.	Dorchester	Dorchester	Dec. 22, 1933	Conviction
Needleman, Nathan	Chelsea	Chelsea	Jan. 9, 1934	Conviction
New England Market, Inc.	Cambridge	Cambridge	Dec. 7, 1933	Conviction
North Main Market, Inc.	Worcester	Worcester	July 9, 1934	Conviction
Parent, Arthur C.	Haverhill	Haverhill	Sept. 6, 1934	Conviction
Parker, Benjamin	Worcester	Worcester	Sept. 7, 1934	Conviction
Parker, Harry	Worcester	Worcester	Sept. 7, 1934	– [5]
Pasay, Felix	Ware	Ware	Jan. 11, 1934	Conviction

[1] Fined $25.00; suspended in care of Probation Officer.
[2] Appealed; Nol Prossed by District Attorney.
[3] Sentence suspended.
[4] Appealed.
[5] Dismissed for want of prosecution.

For Sale of Decomposed Food — Concluded

Pasquale, Joseph	Newburyport	Newburyport	Sept. 28, 1934	Conviction
People's Public Market	Fall River	Fall River	Aug. 16, 1934	Conviction
Pleasant St. Market, Inc.	Northampton	Northampton	Mar. 13, 1934	Conviction
Popkin, Joseph	Roxbury	Roxbury	Aug. 7, 1934	Conviction
Publix Food Markets, Inc.	Malden	Malden	Aug. 10, 1934	Conviction
Publix Food Market, Inc.	Malden	Malden	Oct. 18, 1934	Conviction [1]
Racoff, Bessie	Roxbury	Roxbury	Oct. 10, 1934	Discharged
Rosenberg, Louis	Roxbury	Roxbury	July 17, 1934	Conviction
Rossman, Edward	Revere	Chelsea	Dec. 19, 1933	Conviction
Rossyn, George	Waltham	Waltham	July 11, 1934	Conviction
Rutkowsky, Andrew	Chelsea	Chelsea	April 4, 1934	Conviction
Sack, Benny	Everett	Malden	Sept. 27, 1934	Conviction
Sawyer, Saul	Taunton	Taunton	Dec. 12, 1933	Conviction
Schuster, Samuel	New Bedford	New Bedford	Dec. 7, 1933	Conviction
Silverman, Benjamin	Northampton	Northampton	Mar. 13, 1934	Conviction
Smokler, Julius	Boston	Boston	July 13, 1934	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Discharged
Stark Supply Company	Roxbury	Roxbury	Nov. 5, 1934	Conviction
Steinberg, David	Lynn	Lynn	April 20, 1934	Conviction [1]
Tapor, Joseph	Springfield	Springfield	July 18, 1934	Conviction
Uhlig, Fred	Pittsfield	Pittsfield	Feb. 13, 1934	Conviction
Waldman, Joseph	Roxbury	Roxbury	Oct. 22, 1934	Conviction
Weiner, Harry	Allston	Brighton	June 27, 1934	Conviction
Wernick, Samuel	Roxbury	Roxbury	May 17, 1934	Conviction
Woburn Provision Co.	Everett	Malden	Dec. 16, 1933	Conviction
Woburn Provision Co.	Everett	Malden	Dec. 16, 1933	Conviction
Woburn Provision Co.	Everett	Malden	Sept. 27, 1934	Conviction
Wolf, Samuel	Boston	Boston	July 13, 1934	Conviction
Zass, Lewis	Fall River	Fall River	Dec. 22, 1933	Conviction
Zellin, Samuel	Allston	Brighton	June 27, 1934	Conviction

KIDNEYS

Moskal, John	Holyoke	Holyoke	Feb. 6, 1934	Discharged
North Main Market, Inc.	Worcester	Worcester	Dec. 28, 1933	Conviction
Superski, Albert	Holyoke	Holyoke	Jan. 31, 1934	Conviction

LIVER

Brockelman Bros., Inc.	Worcester	Worcester	Dec. 15, 1933	Conviction
Brockelman Bros., Inc.	Gardner	Gardner	Sept. 9, 1934	Discharged
Brockelman Bros., Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Brockelman Bros., Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Brockelman Bros., Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Dakin Co., Inc., H. L.	Worcester	Worcester	July 9, 1934	Conviction
Economy Grocery Stores, Company	Springfield	Springfield	Jan. 18, 1934	Conviction
Economy Grocery Co.	Springfield	Springfield	Aug. 1, 1934	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Ferman, Sarah	Milford	Milford	Mar. 28, 1934	Conviction
Foti, Frank	Malden	Malden	Oct. 29, 1934	Conviction
Ganem, William	Lawrence	Lawrence	Aug. 28, 1934	–[3]
Growers Outlet, Inc.	Holyoke	Holyoke	Feb. 6, 1934	Conviction
Jacobs, Harold B.	Brighton	Brighton	Aug. 3, 1934	Discharged
La Croix, William J.	Chicopee Falls	Chicopee	Jan. 5, 1934	Conviction
Louis Market, Inc.	Webster	Webster	May 1, 1934	Conviction
Main St. Market, Inc.	Springfield	Springfield	June 20, 1934	Conviction
Mello, Francis J.	Fall River	Fall River	Jan. 12, 1934	Conviction
Packers Outlet, Inc.	Cambridge	Cambridge	Feb. 8, 1934	Conviction
Packers Outlet, Inc.	Cambridge	Cambridge	Feb. 8, 1934	Conviction
Pasay, Felix	Ware	Ware	Jan. 11, 1934	Conviction
Sack, Benny	Everett	Malden	Sept. 27, 1934	Conviction
Schuster, Samuel	New Bedford	New Bedford	Dec. 7, 1933	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Discharged
Solomon, Isador	Gardner	Gardner	Aug. 9, 1934	Discharged

SAUSAGE

Askinas, Abraham	Springfield	Springfield	June 20, 1934	Conviction
Atlantic & Pacific Tea Co., The Great	Worcester	Worcester	Feb. 9, 1934	Conviction
Atlantic & Pacific Tea Co., The Great	Northampton	Northampton	Mar. 13, 1934	Conviction
Central Meat Market & Provision, Inc.	Southbridge	Southbridge	Nov. 14, 1934	Conviction [1]
Chicopee Falls Public Market, Inc.	Indian Orchard	Springfield	June 20, 1934	Conviction
Feingold, Albert	Brookline	Brookline	Aug. 4, 1934	Conviction
Ferman, Sarah	Milford	Milford	Dec. 13, 1933	Conviction
Gould, David	Worcester	Worcester	Feb. 9, 1934	Conviction
Harper, Jr., John N.	Everett	Malden	Nov. 5, 1934	Conviction [2]
Klys, John	Springfield	Springfield	Jan. 18, 1934	Conviction
Klys, John	Springfield	Springfield	Jan. 18, 1934	Conviction
Modest, Herman	Cambridge	Cambridge	April 23, 1934	Conviction
Pasay, Felix	Ware	Ware	Jan. 11, 1934	Conviction
Roberts, Belaine	Shrewsbury	Southbridge	Nov. 14, 1934	Conviction [1]
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Discharged
Stolzberg, Benjamin	Haverhill	Haverhill	Feb. 23, 1934	Conviction
Tillman, Thomas	Springfield	Springfield	Aug. 1, 1934	Conviction

[1] Appealed.

[2] In Superior Court found guilty—given suspended sentence of one month in jail for two years.

[3] Conviction—Appealed; Nol Prossed by District Attorney.

False and Misleading Advertising

BUTTERED POP CORN

(Contained foreign fat substituted for butter)

Bellevue, Howard	Old Orchard, Me.	Brockton	Sept. 14, 1934	Conviction
Boghoshian, Andrew	Indian Orchard	Springfield	Oct. 11, 1934	Conviction
Cook, Herbert W.	Springfield	Springfield	Nov. 20, 1934	Conviction
Dayon, Ernest R.	Beverly	Salem	Sept. 27, 1934	Conviction [1]
Secol, George	New Haven, Conn.	Brockton	Sept. 14, 1934	Conviction

EGGS

(Representing eggs which were not fresh as fresh eggs)

Battaglia, Joseph	Boston	Boston	Feb. 20, 1934	Conviction
Berkman, Inc., Samuel R.	Roxbury	Roxbury	Dec. 8, 1933	Conviction
Bianchi, Leo A.	Springfield	Springfield	July 18, 1934	Conviction
Corey, Arthur	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Erysin, Harry A.	Malden	Malden	Oct. 18, 1934	Dismissed
Feldman, Samuel	Roxbury	Roxbury	Dec. 8, 1933	Conviction
General Fruit Store, Inc.	Worcester	Worcester	Oct. 26, 1934	Conviction
Hood & Sons, Inc., H. P.	Boston	Roxbury	Mar. 7, 1934	Conviction
Jamgochian, George	Somerville	Somerville	May 29, 1934	Conviction
Lessner, Harry	Malden	Lowell	Nov. 13, 1934	Conviction
Manguso, James	Milford	Milford	May 18, 1934	Discharged
Mass. Mohican Company	Salem	Salem	Dec. 1, 1933	Conviction
Pietrella, Samuel	Everett	Malden	Nov. 5, 1934	Conviction
Pirosseno, Achille	North Wilbraham	Palmer	Feb. 16, 1934	Conviction
Polen, Samuel	Waltham	Waltham	Sept. 7, 1934	Conviction
Rabinowitz Delicatessen & Lunch Company	Brookline	Brookline	July 30, 1934	Conviction
Rabinowitz Delicatessen & Lunch Company	Roxbury	Roxbury	Aug. 7, 1934	Conviction
Winer Company, M.	Brookline	Brookline	July 20, 1934	Discharged

MAPLE SYRUP

(False advertising of maple syrup)

Lazaros, Charles	Worcester	Worcester	Jan. 26, 1934	Conviction
Voudouris, Spero	Brookline	Brookline	May 24, 1934	Conviction

For Violation of the Sanitary Food Law

City Provision Co., Inc.	Springfield	Springfield	April 4, 1934	Conviction [1]

For Violation of Bakery Laws

Dauten, Ludwig	Newton	Newton	Jan. 22, 1934	Conviction
Freshette, Alphonse	Newton	Newton	Jan. 27, 1934	Conviction [2]

For Violation of Ice Cream Law

Hager, Clayton M.	Somerville	Somerville	Nov. 15, 1934	Conviction
Partridge, Ashley W.	Lexington	Concord	Nov. 22, 1934	Conviction
Puritan Ice Cream Co. of Boston, Inc., The	Forest Hills	Jamaica Plain	Nov. 16, 1934	Conviction

For Sale of Drugs Not Conforming to the Requirements of the U. S. Pharmacopoeia

ARGYROL

Fogel, Hyman	Boston	Boston	Nov. 27, 1934	Conviction

CITRATE OF MAGNESIA

Kidder & Co., Inc., Samuel	Charlestown	Lawrence	May 18, 1934	Conviction

SWEET SPIRIT OF NITRE

Kimball Pharmacy, Inc.	Springfield	Springfield	May 9, 1934	Conviction

[1] Appealed.

[2] Sentence suspended.

For Violation of the Laws Relative to Cold Storage

SELLING COLD STORAGE EGGS WITHOUT MARKING THE CONTAINER

Armour & Company	Fall River	Fall River	Dec. 22, 1933	Conviction
Baker, Max	Roxbury	Boston	Jan. 16, 1934	Conviction
Beanstock, Lilly	Peabody	Peabody	Jan. 19, 1934	Conviction
Bettencourt, Doulingos S.	Fall River	Fall River	Jan. 12, 1934	Conviction
Bloom, Charles	Cambridge	Cambridge	Feb. 8, 1934	Conviction
Bruno, James	Springfield	Springfield	Jan. 24, 1934	Conviction
Caidozo, Manuel	Pittsfield	Pittsfield	Feb. 9, 1934	Conviction
Caraminas, Nicolas	Springfield	Springfield	Nov. 28, 1934	Conviction
Cimini, Felix	Pittsfield	Pittsfield	Feb. 9, 1934	Conviction
Cohen, Hyman	Boston	Boston	Jan. 3, 1934	Conviction
Cookis, Israel	North Adams	North Adams	Dec. 13, 1933	Conviction
Di Sola, Jerry	Somerville	Somerville	Jan. 8, 1934	Conviction
Donoghue, Raymond	Somerville	Somerville	Dec. 18, 1933	Conviction
Finkle, Morris	Somerville	Somerville	Dec. 18, 1933	Conviction
Fresia, Phillip	Pittsfield	Pittsfield	Feb. 9, 1934	Conviction
Gervlis, George	Peabody	Peabody	Jan. 22, 1934	Conviction
Giberti, Chester	Revere	Chelsea	Jan. 23, 1934	Conviction
Greenberg, Barney	Fall River	Fall River	Dec. 22, 1933	Conviction
Iacopocci, Peter	Somerville	Somerville	Jan. 8, 1934	Conviction
Kelsey Co., Inc., George	Pittsfield	Pittsfield	Dec. 28, 1933	Conviction
Kinder, John	Norwood	Dedham	Dec. 28, 1933	Conviction
Koszik, Matthew J.	Greenfield	Greenfield	Jan. 18, 1934	Conviction
Nardella, Cosimo	Somerville	Somerville	Jan. 8, 1934	Conviction
Pontes, Frank S.	Fall River	Fall River	Jan. 12, 1934	Conviction
Samia, James	North Adams	North Adams	Dec. 20, 1933	Conviction
Santos, Frank	Cambridge	Cambridge	Dec. 7, 1933	Conviction
Santosuosso, Saverio	Revere	Chelsea	Jan. 5, 1934	Conviction
Stillman, Inc., Morris	Lynn	Lynn	Jan. 4, 1934	Conviction
Torres, Manuel	Fall River	Fall River	Jan. 12, 1934	Conviction
Vigoda, Philip	Brookline	Brookline	Dec. 4, 1933	Conviction

OPERATING A COLD STORAGE PLANT WITHOUT A LICENSE

Chesman & Son, Inc., B.	Boston	Boston	June 12, 1934	Conviction

For Violation of the Laws Relative to Slaughtering

SLAUGHTERING OR AUTHORIZING SLAUGHTERING IN THE ABSENCE OF INSPECTOR

Broverman, Isaac	Millis	Walpole	Mar. 26, 1934	Conviction
Davis, Salim	Agawam	Springfield	June 6, 1934	Conviction
Grasso, Angelo	Agawam	Springfield	June 6, 1934	Conviction
Sekscencksi, Stanley	Holyoke	Northampton	Oct. 19, 1934	Conviction

For Violation of the Mattress Laws

American Mattress Mfg. Co.	Boston	Boston	April 2, 1934	Discharged
American Mattress Mfg. Co.	Boston	Boston	April 9, 1934	Conviction
Boodman, Abraham	Boston	Boston	Sept. 20, 1934	Conviction
Charron, Wilfred	Fall River	Fall River	July 19, 1934	Conviction
Cohen, Benjamin	Salem	Salem	May 17, 1934	Conviction [1]
Diamond Mattress Co.	Woonsocket, R. I.	Webster	Jan. 18, 1934	Conviction
Diamond Mattress Co.	Woonsocket, R. I.	New Bedford	July 27, 1934	Conviction
Eagle Upholstery Co., Inc.	Boston	Boston	Nov. 9, 1934	Conviction
Eastern Mattress & Bed Spring Company	Lowell	Lowell	April 18, 1934	Conviction
Feinberg, Samuel	Chelsea	Roxbury	Mar. 13, 1934	Conviction
Florence, Benjamin	Boston	Boston	Mar. 8, 1934	Conviction
Florence, Benjamin	Boston	Charlestown	July 13, 1934	Conviction
Gerson Bedding Company	Lowell	Lynn	Oct. 15, 1934	Conviction
Gerson Bedding Company	Lowell	Lynn	Oct. 15, 1934	Conviction
Gladstone, Harry	Malden	Malden	Oct. 23, 1934	Conviction
Goldstein, Morris	Haverhill	Haverhill	Oct. 13, 1934	Conviction [1]
Interstate Furniture Co.	Worcester	Fitchburg	Sept. 21, 1934	Discharged
Kerr, Samuel D.	Salem	Salem	Aug. 24, 1934	Conviction
Malick, Benjamin	Lynn	Lynn	Mar. 15, 1934	Conviction
Miller, Harry	Lynn	Lynn	Feb. 6, 1934	Conviction
Miller, Morris	Lynn	Lynn	Feb. 6, 1934	Conviction
Milstone, Edward	Lawrence	Lawrence	Nov. 21, 1934	Dismissed
Orenstein, Philip	Springfield	Springfield	Aug. 1, 1934	Conviction
Providence Mattress Co.	Providence, R. I.	Webster	Oct. 25, 1934	Conviction
Raccicot Brothers	Webster	Webster	Jan. 18, 1934	Discharged
Rudnick, Harry	Roxbury	Roxbury	Mar. 13, 1934	Conviction [2]
Sachs, Albert	New Bedford	New Bedford	July 27, 1934	Conviction
Schlager, Saul	Malden	Malden	Oct. 23, 1934	Conviction
Springfield Mattress Co., Inc.	Springfield	Springfield	Feb. 8, 1934	Conviction
Summerfield Company	Boston	Boston	April 10, 1934	Dismissed
Taylor, Saul	New Bedford	New Bedford	July 27, 1934	Conviction
Warshaver, Rubin	Boston	Boston	Aug. 29, 1934	Conviction [3]
Weiner, Samuel	Lynn	Lynn	Mar. 2, 1934	Conviction
Yaffa, Abraham	Beverly	Boston	April 10, 1934	Conviction

[1] Appealed.

[2] Fined $50, paid; sentenced to 3 months in jail—latter sentence suspended.

[3] Superior Court, 2 months in House of Correction—sentence suspended for 1 year.

TABLE 2. — *Summary of Milk Statistics*

Number of samples above standard	4,183
Number of samples below standard	745
Total samples	4,928
Number having more than 15% solids	38
" " between 14% and 15% solids	166
" " " 13% and 14% solids	1,082
" " " 12% and 13% solids	2,897
" " " 11% and 12% solids	651
" " " 10% and 11% solids	72
" " " 9% and 10% solids	17
" " " 8% and 9% solids	4
" " " 7% and 8% solids	1
Number of samples showing removal of part of the cream	55
Number of samples showing added water	65

TABLE 3. — *Average Composition of Milk Samples*

	TOTAL SAMPLES COLLECTED				SAMPLES FOUND NOT ADULTERATED			
	Number of Samples	Solids	Fat	Solids not Fat	Number of Samples	Solids	Fat	Solids not Fat
		%	%	%	%	%	%	%
December	236	12.94	4.14	8.80	233	12.97	4.17	8.80
January	106	12.82	4.08	8.74	104	12.86	4.10	8.76
February	62	12.73	4.00	8.73	60	12.70	4.00	8.69
March	465	12.70	3.97	8.73	457	12.72	3.98	8.74
April	494	12.60	3.92	8.68	487	12.63	3.94	8.69
May	698	12.46	3.89	8.57	680	12.49	3.91	8.58
June	451	12.59	3.96	8.63	434	12.64	4.00	8.64
July	480	11.86	3.74	8.12	465	11.89	3.78	8.11
August	649	12.46	3.94	8.52	635	12.51	3.95	8.56
September	552	12.53	4.02	8.51	533	12.61	4.05	8.56
October	357	12.76	4.08	8.68	350	12.79	4.10	8.69
November	227	12.96	4.17	8.79	222	13.01	4.19	8.82
Totals	4,777	12.54	3.96	8.58	4,660	12.58	3.98	8.60

TABLE 4. — *Summary of Bacteriological Examinations of Milk*

CERTIFIED AND PASTEURIZED MILK

Total samples		65
Samples with count below 50	61	
Samples with count below 500	65	
Lowest count	less than 10	
Highest count	170	
Geometric mean	10	

CERTIFIED MILK

Total samples		59
Samples with count below 10,000	56	
Lowest count	900	
Highest count	16,000	
Geometric mean	2,734	

GRADE A MILK

Total samples		166
Samples with count below 15,000	125	
Samples with count below 25,000	141	
Lowest count	200	
Highest count	440,000	
Geometric mean	8,315	

PASTEURIZED MILK

Total samples		1,028
Samples with count below 25,000	517	
Samples with count below 50,000	710	
Lowest count	30	
Highest count	4,700,000	
Geometric mean	26,865	

GRADE A MASSACHUSETTS MILK

Total samples		15
Samples with count below 100,000	11	
Lowest count	4,800	
Highest count	640,000	
Geometric mean	38,397	

RAW MILK SOLD AS SUCH

Total samples		314
Samples with count below 300,000	259	
Lowest count	1,300	
Highest count	3,500,000	
Geometric mean	46,861	

RAW MILK FOR GRADE A PURPOSES

Total samples		168
Samples with count below 100,000	105	
Samples with count below 250,000	150	
Lowest count	1,000	
Highest count	4,600,000	
Geometric mean	16,575	

RAW MILK FOR PASTEURIZATION PURPOSES

Total samples		2,287
Samples with count below 100,000	1,214	
Samples with count below 250,000	1,609	
Samples with count below 500,000	1,850	
Samples with count below 750,000	1,946	
Lowest count	300	
Highest count	34,000,000	
Geometric mean	88,701	

SUMMARY

Total samples examined		4,102
Samples complying with requirements	3,338	

TABLE 5. — *Summary of Analyses of Food Samples*

CHARACTER OF SAMPLE	NOT DECLARED ADULTERATED OR MISBRANDED	ADULTERATED OR MISBRANDED	TOTAL
Alcoholic beverages	12	2	14
Bakery products	4	4	8
Butter	92	15	107
Buttered popcorn	4	14	18
Buttermilk	2	–	2
Canned foods	6	–	6
Celery	5	1	6
Cereal preparations	4	–	4
Chocolate drink	5	–	5
Chocolate milk	1	1	2
Chocolate syrup	2	–	2
Cider	1	–	1
Confectionery	25	61	86
Cream	53	3	56
Cream (sour)	53	14	67
Cream cheese	53	19	72
Dried fruits	2	5	7
Eggs	159	75	234
Flavoring extracts:			
(other than vanilla)	18	11	29
Flavoring extracts, vanilla	106	15	121
Fish	5	2	7
Frozen desserts:			
(chemical examinations)	411	4	415
Fruit syrup	–	1	1
Horse radish	1	–	1
Jam	1	–	1
Marshmallow	1	–	1
Maple butter	–	1	1
Maple sugar	1	–	1
Maple syrup	2	2	4
Meat products:			
Chicken salad	3	–	3
Chicken	–	2	2
Hamburg steak	335	152	487
Kidneys	3	2	5
Liver	29	30	59
Pigs' feet	1	–	1
Pork	2	–	2
Sausages	698	78	776
Stew beef	2	1	3
Olive oil	3	2	5
Pickles	16	5	21
Pie filling	5	3	8
Spices	8	1	9
Vinegar	14	–	14
Totals	2,148	526	2,674

TABLE 6. — *Summary of Analyses of Drug Samples*

CHARACTER OF SAMPLE	NOT DECLARED ADULTERATED OR MISBRANDED	ADULTERATED OR MISBRANDED	TOTAL
Argyrol solution	35	4	39
Aromatic spirit of ammonia	3	–	3
Aspirin tablets	2	–	2
Camphorated oil	49	3	52
Effervescent salts	2	–	2
Headache powders	2	–	2
Lime water	3	1	4
Magnesium citrate solution	19	5	24
Mineral oil	1	–	1
Olive oil	26	–	26
Sodium phosphate	12	–	12
Sodium sulphite	2	–	2
Spirit of anise	5	1	6
Spirit of camphor	43	–	43
Spirit of nitrous ether	54	8	62
Spirit of peppermint	10	–	10
Syrup of hydriodic acid	4	1	5
Tincture of iodine	50	2	52
Totals	322	25	347

TABLE 7. — *Confiscations*

IN WAREHOUSES		
Geese	55 lbs	Decomposed
Ham (cooked)	8 lbs.	Decomposed
Ham (cooked)	644 lbs.	Decomposed
Ham, spiced	766 lbs.	Decomposed
Ham, spiced (cooked)	4,000 lbs.	Decomposed
Lamb	110 lbs.	Dried out
Luncheon meat	6 lbs.	Decomposed
Luncheon meat (cooked)	161 lbs.	Decomposed
Moose meat	212 lbs.	Decomposed
Pigs' feet (cooked)	120 lbs.	Decomposed
Pork loins	137 lbs	Decomposed
Veal	120 lbs.	Dried out
Squid	225 lbs.	Decomposed
IN STORES, MARKETS, ETC.		
Fowl	25 lbs.	Decomposed
Turkey (cut up)	43 lbs.	Decomposed
Beefsteak	3½ lbs.	Decomposed
Frankforts	40 lbs.	Decomposed
Frankforts	30 lbs.	Decomposed
Frankforts	30 lbs.	Decomposed
Hamburg steak	5 lbs.	Decomposed
Hamburg steak	20 lbs.	Decomposed
Hamburg steak	4 lbs.	Decomposed
Hamburg steak	20 lbs.	Decomposed
Hamburg steak	3 lbs.	Decomposed
Hamburg steak	3 lbs.	Decomposed
Hamburg steak	30 lbs.	Decomposed
IN FACTORY		
Pickles	1,500 bbls.	Decomposed
Pickles	51 bbls.	Decomposed
Total Confiscations	6,820½ lbs. 1,551 bbls.	

Summary of Tables 8, 9, 10

Requests for extension of time granted		120
Butter	1	
Eggs	34	
Poultry	40	
Meat and Meat Products	24	
Game	2	
Fish	19	
Requests for extension of time not granted		6
Eggs	1	
Meat and meat products	4	
Fish	1	
Articles ordered removed from storage (no requests made)		12
Butter	1	
Eggs	2	
Poultry	3	
Meat and meat products	5	
Game	1	

TABLE 8. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1933, to December 1, 1934*

(Reason for such extension being that goods were in proper condition for further storage.)

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Butter	960	July 1, 1933	*Sept. 15, 1934	State Teachers College
Eggs, Mixed	46,830	June 7, 1933	Sept. 7, 1934	Borden Sales Co., Inc.
Eggs, Mixed	1,000	May 5, 1933	Aug. 5, 1934	Standard Brands, Inc.
Eggs, Mixed	14,370	May 20, 1933	Aug. 20, 1934	Standard Brands, Inc.
Eggs, Mixed	2,160	May 31, 1933	Aug. 31, 1934	Standard Brands, Inc.
Eggs, Mixed	1,380	May 27, 1933	Aug. 1, 1934	Stone Co., Charles H.
Eggs, Mixed	29,100	May 1, 1933	*Dec. 31, 1934	Swift & Co.
Sugaryolks	630	June 16, 1933	Sept. 18, 1934	Frigid Food Products, Inc.
Sugaryolks	14,700	May 1, 1933	*Dec. 31, 1934	Swift & Co.
Egg Whites	5,790	Mar. 24, 1933	July 1, 1934	Frigid Food Products, Inc.
Egg Whites	7,440	April 4, 1933	July 4, 1934	Standard Brands, Inc.
Egg Whites	24,000	May 5, 1933	Aug. 5, 1934	Standard Brands, Inc.
Egg Whites	465	Mar. 29, 1933	July 1, 1934	Stone Co., Charles H.
Egg Whites	2,490	May 27, 1933	*Dec. 1, 1934	Stone Co., Charles H.
Egg Whites	900	May 1, 1933	June 30, 1934	Swift & Co.
Eggs, Whole	18,000	Mar. 1, 1933	June 17, 1934	Armour & Co.
Eggs, Whole	2,760	Mar. 28, 1933	July 1, 1934	Borden Sales Co., Inc.
Eggs, Whole	1,170	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	27,900	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	8,730	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	870	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	330	June 8, 1933	July 8, 1934	Swift & Co.
Egg Yolks	2,520	Mar. 16, 1933	June 16, 1934	Frigid Food Products, Inc.
Egg Yolks	4,380	Mar. 16, 1933	June 16, 1934	Frigid Food Products, Inc.
Egg Yolks	3,240	June 16, 1933	Sept. 18, 1934	Frigid Food Products, Inc.
Egg Yolks	420	Feb. 1, 1933	*Aug. 1, 1934	Standards Brands, Inc.
Egg Yolks	1,000	Feb. 1, 1933	*Aug. 1, 1934	Standard Brands, Inc.
Egg Yolks	11,850	May 5, 1933	Aug. 5, 1934	Standard Brands, Inc.
Egg Yolks	8,630	May 13, 1933	*Nov. 13, 1934	Standard Brands, Inc.
Egg Yolks	1,920	June 27, 1933	Aug. 1, 1934	Standard Brands, Inc.
Egg Yolks	1,326	April 17, 1933	May 27, 1934	Genery Stevens Co.
Egg Yolks	1,350	Mar. 29, 1933	July 1, 1934	Stone Co., Charles H.
Egg Yolks	2,880	April 5, 1933	July 1, 1934	Stone Co., Charles H.
Egg Yolks	2,340	May 27, 1933	*Dec. 1, 1934	Stone Co., Charles H.
Egg Yolks	6,000	May 31, 1933	*Dec. 31, 1934	Swift & Co.
Broilers	4,922	Aug. 1, 1933	Jan. 1, 1935	Frosted Foods Sales Corp.
Broilers	5,659	Aug. 1, 1933	Jan. 1, 1935	Frosted Foods Sales Corp.
Chickens	3,628	Dec. 17, 1932	Mar. 17, 1934	Bartlett, Varney Co.
Chickens	468	Jan. 24, 1933	Mar. 24, 1934	Bartlett, Varney Co.
Chickens	3,612	April 16, 1933	Oct. 1, 1934	Frosted Foods Sales Corp.
Cocks	1,218	May 20, 1933	July 20, 1934	Bartlett, Varney Co.
Cocks	6,020	May 20, 1933	July 20, 1934	Bartlett, Varney Co.
Cocks	13,883	May 29, 1933	July 29, 1934	Bartlett, Varney Co.
Cocks	1,060	May 29, 1933	July 29, 1934	Bartlett, Varney Co.
Cocks	1,612	May 29, 1933	July 29, 1934	Bartlett, Varney Co.
Cocks	1,071	June 14, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	3,543	June 22, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	2,871	June 27, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	2,592	June 27, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	2,356	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	12,681	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	450	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	6,866	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	1,269	July 3, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	1,640	July 3, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	4,264	July 3, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	2,522	July 6, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	5,784	July 6, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	2,565	July 6, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	2,022	July 9, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	3,275	July 9, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	4,500	July 9, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	1,459	July 10, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	795	July 12, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	264	July 12, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	3,174	July 13, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	13,715	July 13, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	914	July 19, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	9,331	July 19, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	479	July 20, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	10,503	July 20, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	2,137	July 26, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	7,895	July 26, 1933	Dec. 20, 1934	Berman & Co., Inc.
Fowl	5,096	Dec. 8, 1932	*June 30, 1934	Frosted Foods Sales Corp.
Fowl	128	June 27, 1933	Aug. 26, 1934	Gilbert, A. W.
Beef Briskets	7,923	Mar. 18, 1933	June 15, 1934	New England Provision Co.
Beef Briskets	5,172	Feb. 21, 1933	June 1, 1934	Quincy Market C. S. & W. Co.
Briskets	2,178	June 3, 1933	July 10, 1934	Learnard Co., S. S.
Briskets	867	June 10, 1933	July 10, 1934	Learnard Co., S. S.
Beef Livers	12,250	Oct. 13, 1933	Jan. 31, 1935	United Markets, Inc.
Beef Loins	990	May 19, 1933	July 1, 1934	Learnard Co., S. S.
Beef Loins	5,104	Mar. 31, 1933	Aug. 15, 1934	South Market Beef Co.
Beef Ribs	450	May 6, 1933	Aug. 7, 1934	Learnard Co., S. S.

TABLE 8. — *Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1933, to December 1, 1934* — Concluded

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Beef Ribs	996	May 13, 1933	July 13, 1934	Learnard Co., S. S.
Beef Ribs	900	May 17, 1933	July 1, 1934	Learnard Co., S. S.
Beef Tenderloins . .	101	May 6, 1933	Aug. 7, 1934	Learnard Co., S. S.
Beef Tenderloins . .	155	May 17, 1933	July 1, 1934	Learnard Co., S. S.
Calves' Liver . . .	1,200	Aug. 1, 1933	Jan. 1, 1935	Brockelman Bros., Inc.
Pot Roasts . . .	1,971	Jan. 11, 1933	April 1, 1934	Frosted Foods Sales Corp.
Rib Roasts . . .	5,214	Jan. 17, 1933	April 1, 1934	Frosted Foods Sales Corp.
Sirloin Roasts . . .	3,465	Jan. 3, 1933	May 1, 1934	Frosted Foods Sales Corp.
Lamb	10,738	Aug. 1, 1932	Mar. 1, 1934	Armour & Co.
Lamb	21,056	Sept. 1, 1932	Mar. 1, 1934	Armour & Co.
Lamb	21,310	Sept. 1, 1932	Mar. 1, 1934	Armour & Co.
Lamb Legs . . .	6,498	Mar. 30, 1933	July 1, 1934	Frosted Foods Sales Corp.
Pork Loins . . .	6,655	July 12, 1933	Oct. 8, 1934	Boston Beef Co.
Pork Loins . . .	9,263	Dec. 21, 1932	*April 1, 1934	Learnard Co., S. S.
Pork Loins . . .	502	July 1, 1933	Aug. 3, 1934	Learnard Co., S. S.
Pork Loins . . .	603	July 3, 1933	Aug. 3, 1934	Learnard Co., S. S.
Venison	139	Nov. 1, 1933	Mar. 1, 1935	Wells, L. H.
Venison	54	Nov. 28, 1933	Mar. 1, 1935	Wells, L. H.
Eels	1,500	Sept. 25, 1933	Mar. 25, 1935	Busalacchi, T. & J.
Haddock Fillets . .	18,360	June 1, 1933	*Jan. 18, 1935	Gorton-Pew Fisheries Co., Ltd
Haddock Fillets . .	690	Sept. 29, 1933	Nov. 29, 1934	Rush Fish Co.
Halibut	1,953	Oct. 30, 1933	Jan. 15, 1935	Warren Fitch Co., Inc.
Halibut	2,081	Nov. 3, 1933	Feb. 8, 1935	Harding Co., F. E.
Halibut	803	Oct. 9, 1933	Jan. 15, 1935	Pier Fish Co.
Halibut	4,039	Oct. 11, 1933	Jan. 15, 1935	Pier Fish Co.
Halibut	1,600	Oct. 18, 1933	Jan. 1, 1935	Rich Co., Joseph A.
Halibut	5,129	Oct. 18, 1933	Jan. 1, 1935	Rich Co., Joseph A.
Halibut	7,093	Oct. 18, 1933	Jan. 1, 1935	Rich Co., Joseph A.
Halibut, Chicken . .	200	July 20, 1933	Dec. 31, 1934	New England Fish Co.
Halibut, L. & M. . .	2,420	July 19, 1933	Dec. 31, 1934	Booth Fisheries Co.
Halibut, Medium . .	1,252	July 19, 1933	Dec. 31, 1934	Booth Fisheries Co.
Halibut, S. & M. . .	1,800	July 19, 1933	Dec. 31, 1934	New England Fish Co.
Mullets	270	Nov. 28, 1933	Dec. 27, 1934	Crocker & Winsor
Salmon, King . . .	600	Oct. 31, 1933	Jan. 1, 1935	Prior Co., P. H.
Salmon, Silver . . .	809	Oct. 11, 1933	Jan. 1, 1935	Neal Co., J. R.
Shrimp	1,200	**Nov. 11, 1933	Nov. 18, 1934	Foley Co., M. F.
Sole Fillets . . .	2,320	June 28, 1933	Sept. 28, 1934	General Seafoods Corp.

* The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

**Received frozen and undated from outside state.

TABLE 9. — *Requests for Extension of Time Not Granted on Goods in Cold Storage from December 1, 1933, to December 1, 1934*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Egg Whites	4,110	April 11, 1933	Frigid Food Products, Inc.
Briskets	——	June 3, 1933	Learnard Co., S. S.
Briskets	——	June 10, 1933	Learnard Co., S. S.
Tenderloins	——	May 17, 1933	Learnard Co., S. S.
Pork Loins	——	Dec. 21, 1932	Learnard Co., S. S.
Halibut, Medium	250	Sept. 20, 1933	Nagle Co., John

TABLE 10. — *Articles Which Had Been in Cold Storage Longer than Twelve Months, and on Which No Requests for Extensions Had Been Made, Ordered Removed, from December 1, 1933, to December 1, 1934*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Butter	128	July 1, 1933	State Teachers College
Egg Whites	690	Mar. 1, 1933	Armour & Co.
Eggs, Whole	——	June 23, 1933	Standard Brands, Inc.
Chickens	30	Feb. 25, 1933	Green, H. W.
Chickens	885	Dec. 3, 1932	Rosoff, T.
Turkeys	125	Jan. 2, 1933	Holland Butter Co.
Beef Livers	——	——	Anderson & Sundquist
Beef Livers	——	July 12, 1933	Bond, G. F.
Beef Ribs	783	June 19, 1933	Butterfield, J. H.
Beef Ribs	1,124	June 28, 1933	Butterfield, J. H.
Pork Loins	——	——	Laurier & Hutchinson
Venison	6	Jan. 14, 1933	Cosgrove, E. A.

TABLE 11. — *Articles Other than Fish Placed in Cold Storage from December 1, 1933, to December 1, 1934*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December	760,549	217,260	322,940	335,562	1,500,295	179,305	2,105,021	65,716	548,456	465,943	1,784,058	68,401	1,639,161
January	807,818	284,430	341,968	156,505	978,046	119,599	833,420	41,268	184,554	337,320	2,706,105	18,164	1,348,094
February	434,732	165,930	419,970	89,737	489,042	128,077	290,384	17,654	223,835	337,993	2,141,126	53,058	1,160,304
March	328,564	688,260	521,243	43,622	487,123	100,750	226,819	17,737	104,070	325,726	872,174	17,756	1,236,629
April	394,582	3,698,280	1,385,021	64,090	444,202	60,059	148,883	11,756	316,291	393,560	1,015,974	27,624	667,544
May	1,111,546	2,952,030	1,782,308	84,251	389,481	312,589	343,576	42,074	371,640	396,778	2,869,479	37,111	865,045
June	2,711,477	1,439,640	1,728,645	14,063	217,630	341,775	238,428	206,638	309,811	292,286	1,856,884	66,233	1,067,069
July	3,689,854	439,680	1,028,048	179,266	150,575	336,602	186,163	298,459	240,993	396,387	1,648,874	61,297	1,795,121
August	1,890,426	461,910	625,589	255,942	96,986	281,442	153,352	273,373	179,345	827,253	1,857,621	40,966	1,289,974
September	1,175,716	488,160	210,350	451,869	119,564	221,654	118,309	168,219	205,183	919,446	1,578,003	130,879	1,552,727
October	822,398	388,740	351,155	617,275	261,734	170,549	38,002	71,174	264,362	761,742	1,347,024	112,678	1,403,350
November	486,327	262,170	671,456	324,998	551,454	337,796	734,009	36,439	145,930	1,291,875	3,151,407	217,141	2,266,922

TABLE 12. — *Articles Other than Fish on Hand in Cold Storage on the First Day of the Month, from January 1, 1934, through December 1, 1934*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January	2,888,562	497,580	2,052,567	1,640,240	3,052,201	1,467,524	2,112,898	837,337	716,857	1,409,416	2,490,494	399,332	2,341,866
February	1,885,372	15,120	1,635,382	1,530,243	3,660,688	1,130,754	2,609,828	659,635	620,996	1,274,178	4,610,276	309,807	1,686,674
March	1,018,238	46,380	1,200,571	1,359,462	3,526,899	838,854	2,307,772	388,380	598,258	1,055,140	5,065,712	282,511	1,646,204
April	438,664	628,380	937,956	1,026,330	3,146,566	457,740	1,592,759	112,491	414,265	1,110,469	4,623,348	251,288	1,621,511
May	346,259	4,213,830	1,514,398	550,822	2,498,542	68,033	1,141,583	5,483	358,322	892,231	4,128,121	200,356	1,615,685
June	1,081,119	6,995,610	2,307,160	306,271	1,966,191	266,012	1,049,854	23,382	426,062	807,187	5,328,146	192,777	1,442,950
July	3,361,728	8,048,010	3,303,774	178,109	1,345,221	481,973	972,028	219,262	508,554	804,602	5,442,448	179,271	1,619,782
August	6,399,369	7,648,350	3,595,389	250,729	749,994	635,780	850,549	486,070	556,333	782,034	5,336,438	136,493	2,215,153
September	6,796,664	6,882,720	3,476,928	460,875	354,421	617,322	567,713	699,536	461,251	1,127,250	4,430,150	106,578	2,316,738
October	6,663,665	5,594,940	2,988,846	881,296	250,163	619,898	398,766	846,956	468,256	1,436,665	3,557,700	130,008	3,074,735
November	5,584,413	3,791,400	2,548,557	1,447,550	334,635	484,874	104,812	883,774	536,660	1,518,062	3,259,200	191,276	3,034,049
December	2,809,181	2,033,730	2,305,818	1,704,434	777,018	653,957	599,873	740,250	540,011	2,457,995	4,650,614	362,849	3,831,388

TABLE 13. — *Fish Placed in Cold Storage from December 15, 1933, to December 15, 1934*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January . . .	1,070	3,995	2,565	–	264,666	16,605	622,401	148,185	142,919	23,276	86,290	2,500	–	17,422	1,536	–	5,295	408,819
February . . .	605	5,729	6,400	1,668	98,510	33,685	727,334	136,756	78,697	86,587	109,542	3,800	10,018	37,657	–	–	306,040	354,187
March . . .	819	4,720	10,500	17,673	103,535	11,535	719,902	124,020	49,440	64,333	97,114	2,931	20,851	74,680	13,906	–	123,895	121,548
April . . .	634	1,959	50,564	8,067	890,745	27,292	2,115,223	4,577	73,000	72,094	3,650	2,512	–	77,654	–	7,874	158,639	430,469
May . . .	1,496	–	83,526	1,060	710,192	98,898	2,301,544	28,460	109,260	193,755	1,436	1,970	1,964	16,399	100,366	–	22,950	421,658
June . . .	5,638	241,771	43,892	6,000	506,406	172,138	2,966,780	13,564	1,295,310	1,778,700	1,001	1,586	9,782	1,400	955,414	190	1,914,789	358,537
July . . .	372	256,417	16,653	9,268	996,991	46,666	2,453,391	52,268	243,195	1,539,699	14,769	15,518	306,470	–	139,502	5,830	5,071,252	544,376
August . . .	6,223	15,230	480	8,164	804,340	12,580	2,467,579	17,397	258,300	1,642,592	10,438	9,958	11,695	915	201,666	623	2,612,287	707,468
September . . .	17,899	1,466	1,380	6,639	580,688	2,738	2,690,854	2,924	262,970	3,657,036	2,381	3,160	13,900	1,325	5,937	505	1,211,398	609,464
October . . .	30,294	2,432	405	2,050	681,768	28,275	1,816,037	111,314	272,693	1,269,606	5,625	9,094	–	232	101,882	1,475	696,547	570,641
November . . .	1,093	4,463	75	–	963,826	19,817	368,967	290,184	205,301	95,428	30,325	3,312	9,550	58,659	215,725	355	307,244	371,753
December . . .	1,764	2,415	761	2,250	4,556,338	79,451	1,277,530	143,734	184,520	36,099	98,384	2,050	4,525	67,914	70,916	15,804	166,760	1,084,187

TABLE 14. — *Fish on Hand in Cold Storage on the Fifteenth Day of the Month, from January 15, 1934, through December 15, 1934*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	17,121	77,329	29,244	6,032	1,245,563	48,888	3,167,578	221,273	510,594	3,755,823	43,618	26,641	21,872	20,686	183,718	997	3,768,036	1,463,596
February	8,940	51,461	24,258	3,754	505,697	43,837	1,879,222	179,152	371,050	2,467,062	96,956	17,992	23,295	23,577	119,166	362	2,932,522	1,204,112
March	4,847	26,634	11,158	9,007	112,445	11,977	404,556	103,755	188,901	1,185,876	124,941	16,000	4,530	73,021	55,058	–	1,481,232	778,706
April	973	2,601	19,045	8,159	578,333	25,612	1,254,474	99,417	9,145	202,717	60,052	12,299	490	113,224	6,212	–	544,910	720,611
May	1,583	80	95,204	1,419	838,508	113,610	2,014,958	110,459	106,955	98,988	23,252	10,337	2,050	118,769	101,136	–	164,562	746,937
June	5,141	241,273	131,001	5,034	883,744	264,915	3,769,438	116,445	1,079,565	1,764,309	1,047	10,791	11,786	115,956	1,010,209	190	1,735,165	759,194
July	4,939	491,145	125,959	13,462	1,550,788	300,590	5,230,724	160,873	970,637	3,242,815	12,854	12,861	317,706	112,924	1,073,087	5,845	6,462,078	1,035,257
August	10,451	491,014	115,481	19,511	1,956,808	296,585	6,272,908	172,332	1,019,414	4,454,053	20,750	15,429	325,277	111,720	1 035,779	6,021	7,656,270	1,563,968
September	27,468	485,797	20,405	24,580	1,779,486	268,468	5,802,282	111,628	1,054,766	7,532,511	16,943	15,530	336,635	111,796	916,586	6,346	7,545,910	1,952,131
October	55,382	456,564	13,580	21,960	1,274,859	274,298	4,573,765	177,220	1,090,375	7,955,359	19,451	20,580	269,765	104,253	916,660	6,508	7,021,338	2,097,368
November	48,302	425,209	3,396	15,415	1,582,405	192,552	3,175,502	397,833	1,016,861	6,688,011	40,487	18,491	197,731	101,296	749,388	4,676	6,247,639	1,735,527
December	41,586	382,272	3,562	13,625	3,604,525	246,019	3,627,503	339,793	846,757	5,249,888	86,788	14,232	174,071	99,049	689,608	17,852	5,761,795	2,365,218

TABLE 15. — *Summary of Slaughtering Inspections from December 1, 1933, through November 30, 1934*

Total number of carcasses inspected	159,396	Total number of carcasses condemned	1,931
Cattle	31,681	Cattle	381
Calves	77,586	Calves	1,308
Hogs	42,738	Hogs	240
Sheep	7,391	Sheep	2

REASONS FOR CONDEMNATION	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	–	1,200	–	–	1,200
Tuberculosis	312	3	32	–	347
Cholera	–	–	114	–	114
Died otherwise than by slaughter	3	64	14	1	82
Bruised or injured	8	15	15	–	38
Septicemia	6	1	22	1	30
Emaciated	10	10	7	–	27
Pneumonia	12	2	12	–	26
Multiple abscesses	10	2	4	–	16
Decomposition	–	–	10	–	10
Parturient Paresis	7	–	–	–	7
Enteritis	–	3	1	–	4
Icterus	2	2	–	–	4
Peritonitis	2	–	–	–	2
Tumor	–	–	2	–	2
Mastitis	2	–	–	–	2
Stillborn	–	2	–	–	2
Abortion	1	1	–	–	2
Urticaria	–	–	2	–	2
Purulent Pericarditis	2	–	–	–	2
Exposure	–	1	1	–	2
Slaughtered illegally	–	–	1	–	1
Worms	–	–	1	–	1
Measles	–	–	1	–	1
Dystocia	1	–	–	–	1
Prostration	–	1	–	–	1
Septic Metritis	1	–	–	–	1
Sexual odor	1	–	–	–	1
Insufficient bleeding	–	1	–	–	1
Gastritis	–	–	1	–	1
Actinomycosis	1	–	–	–	1
Totals	381	1,308	240	2	1,931

Liquor Report for 1934
Character of Samples

CITIES AND TOWNS	Beer	Cider	Wine	Distilled spirits	Extracts	Alcohol	Miscellaneous	Total
Boston	42	–	7	223	–	87	4	363
Cambridge	9	–	2	31	–	9	–	51
Chelsea	–	–	1	29	–	2	–	32
Everett	3	–	–	15	–	8	–	26
Lawrence	3	–	2	17	–	6	–	28
Lowell	13	–	1	38	–	8	–	60
Lynn	4	–	1	34	–	5	–	44
Dep't Pub. Safety	43	1	9	110	–	19	–	182
Alc. Bev. Con. Com.	96	–	4	96	–	5	2	203
*Miscellaneous	99	3	21	141	–	36	11	311
Total	312	4	48	734	–	185	17	1,300

* From 58 towns submitting less than twenty-five samples each.

GENERAL SUMMARY OF ANALYSES

	Complying with Requirements	Not Complying with Requirements	Total
Milk (chemical)	4,183	745	4,928
Milk (bacteriological)	3,338	764	4,102
Ice cream (bacteriological)	295	85	380
Food other than milk	2,148	526	2,674
Whiskey	8	2	10
Drugs	322	25	347
Mattress filling	16	14	30
Industrial preparations examined for quantity of methyl alcohol	121	39	160
Coal	1	4	5
Samples examined for Department of Labor and Industries	2	–	2
Liquor examined for police departments	–	–	1,300
Drugs and chemicals examined for police departments	28	80	108
Total (except liquor)	10,462	2,284	12,746
Total			14,046

REPORT OF THE DIVISION OF SANITARY ENGINEERING

ARTHUR D. WESTON, *Director and Chief Engineer*

OVERSIGHT AND CARE OF INLAND WATERS

During the year 1934 the Division of Sanitary Engineering investigated 662 applications requiring the advice of this Department, of which 199 related to municipal water supplies, 164 to private water supplies, 17 to water supplies at schools, 58 to water supplies at camps, 6 to sources of ice supply, 55 to bathing and swimming pools, 19 to shellfish, 6 to pollution of streams, 58 to sewerage and sewage disposal, 12 to Civilian Conservation Corps Camps and 68 to miscellaneous matters. The number of applications received is the largest ever received by the Department in any calendar year and is about 33 per cent in excess of the number received during the year 1933. All of these applications required field investigations by the engineers and in most cases chemical analyses by the Water and Sewage Laboratories and bacterial examinations by the Lawrence Experiment Station. In addition, many of the applications required field examinations by the chemists.

WATER SUPPLIES

Examination of Public Water Supplies

During the year public water supplies were introduced in the towns of Paxton and Townsend and the village of Barnstable in the town of Barnstable. Consequently, the number of cities and towns having public water supplies has now been increased to 241 which includes several smaller towns supplied only in part by water companies, industrial plants and by other towns. Plans have been approved in the matter of public water supply in the town of Sterling, but efforts to introduce such supplies in Essex and Sudbury failed because of the adverse town meeting action. There have been a number of important improvements in some of the water supplies, viz., construction of filters at Braintree and Newburyport and introduction of chlorinating apparatus at Colrain (Griswoldville), Danvers, Dracut, Gardner, Leominster, Maynard, Northborough, Pittsfield and Russell. Water supplies in South Deerfield, Egremont, Fitchburg and Hudson were chlorinated temporarily during periods of the year. In Fitchburg chlorination was necessary because of an epidemic of enteritis believed to have been caused by workmen employed on the watershed, while in Danvers it was necessary to chlorinate the water because of known sewage pollution at no great distance from the water works pumping station. Plans for filtering the water supplies of Leominster, Northborough, Weymouth and of Salem and Beverly were approved by the Department during the year.

As in the year 1933, the examinations of the public water supplies have been somewhat more extensive than in previous years. This practice was deemed necessary because of the possibility of insanitary conditions on the watersheds from the employment of men in various programs of relief of unemployment. Samples have been collected regularly for chemical analysis and microscopical examination and a large number of samples have been collected for bacterial examination in connection with the various supplies.

In order to expedite the work of the Division an assistant engineer was assigned to the office of the District Health Officer at Springfield to investigate and report relative to sanitary engineering problems in Health Districts 6 and 7 and the Southern Berkshire Health District. This assignment not only made it possible to maintain closer supervision in matters of water supply, sewerage and sewage disposal but reduced considerably the cost of travel.

The following tables show the average results of chemical analyses of samples of water collected from the various sources of public water supply during the year 1934:

Analyses of the Water of Public Water Supplies
Average of Chemical Analyses of Surface-Water Sources for the Year 1934

[Parts per Million]

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorine	Hardness
				Free	ALBUMINOID			
					Total	Suspended		
Metropolitan Water District	Wachusett Reservoir, upper end	24	38	.028	.101	.027	2.5	15
	Wachusett Reservoir, lower end	10	35	.020	.088	.024	2.5	15
	Sudbury Reservoir	15	40	.024	.104	.030	2.9	17
	Framingham Reservoir No. 3	17	42	.040	.111	.028	3.3	20
	Hopkinton Reservoir	49	44	.022	.135	.027	3.2	14
	Ashland Reservoir	51	47	.014	.141	.034	4.1	16
	Framingham Reservoir No. 2	78	61	.059	.181	.039	6.6	17
	Lake Cochituate	17	75	.109	.149	.041	8.2	31
	Chestnut Hill Reservoir	13	46	.086	.105	.029	4.1	21
	Weston Reservoir	16	40	.020	.104	.031	3.0	19
	Spot Pond	9	39	.011	.106	.032	3.8	19
	Tap in State House	11	40	.013	.083	.021	3.8	19
	Tap in Revere	7	40	.007	.073	.019	3.7	18
	Tap in Quincy	9	41	.005	.062	.016	3.8	21
Abington	Big Sandy Pond	6	38	.017	.119	.028	8.4	9
Acushnet (Fire and Water District)	New Bedford Water Supply							
Adams (Fire District)	Bassett Brook	0	44	.006	.026	.009	1.0	32
Agawam	Springfield Water Supply							
Amherst (Water Co.)	Atkins Pond	9	34	.076	.237	.106	1.7	10
	Amethyst Brook-intake reservoir	22	40	.022	.086	.019	1.8	10
Andover	Haggett's Pond	14	51	.051	.134	.043	5.2	24
Arlington	Metropolitan Water Supply							
Ashburnham	Upper Naukeag Lake	4	28	.011	.067	.015	1.8	8
Ashfield (Water Co.)	Highland Spring Reservoir	27	54	.005	.069	.016	1.1	37
Athol	Buckman Brook Reservoir (Newton Reservoir)	17	30	.008	.098	.037	1.4	9
	Thousand Acre Meadow Brook	132	57	.037	.261	.094	1.6	15
	Inlet, Summer Street filters	16	31	.014	.095	.036	1.5	10
	Outlet, Summer Street filters	12	32	.016	.095	.027	1.7	10
	Phillipston Reservoir	43	45	.129	.246	.065	2.9	14
	Outlet of Mechanical Filter	44	42	.041	.221	–	2.4	14
Barre	Reservoir	13	32	.022	.112	.021	1.6	17
Belmont	Metropolitan Water Supply							
BEVERLY	Joint supply with Salem							
Blackstone	Tap (supply from Woonsocket, R. I.)	29	46	.004	.101	.021	4.1	22
Blandford	Freeland Brook	6	37	.003	.025	.005	2.0	19
BOSTON	Metropolitan Water Supply							
Braintree	Joint supply with Randolph							
BROCKTON	Silver Lake	6	33	.018	.099	.040	6.0	8
Brookfield	Cooley Hill Reservoir	7	34	.060	.140	.036	1.8	12
CAMBRIDGE	Fresh Pond	9	91	.046	.127	.029	7.8	42
	Filter effluent	1	96	.021	.047	–	7.5	47
	Stony Brook Reservoir	29	70	.048	.163	.034	6.4	31
	Upper Hobbs Brook Reservoir	34	62	.054	.191	.036	5.2	27
	Lower Hobbs Brook Reservoir	14	57	.046	.186	.045	5.2	27
CHELSEA	Metropolitan Water Supply							
Cheshire (Water Co.)	Kitchen Brook Reservoir	4	50	.005	.021	.009	1.2	36
Chester	Austin Brook Reservoir	10	37	.019	.065	.021	1.3	15
	Horn Pond	14	39	.021	.127	.027	1.2	16
CHICOPEE	Cooley Brook Reservoir, filtered	2	60	.024	.025	–	2.6	30
	Morton Brook	5	55	.023	.064	.036	3.3	23
Clinton	Lower Lynde's Reservoir	18	35	.108	.159	.057	2.4	14
	Heywood Pond	8	25	.051	.113	.038	2.0	9
	Spring Basin	8	50	.060	.089	–	2.8	21
Colrain (Griswoldville)	McClellan Brook Reservoir	4	72	.003	.064	.028	1.7	50
Colrain (Fire District No. 1)	Mountain Brook Reservoir	8	80	.002	.027	.005	1.3	68
Concord	Nagog Pond	4	33	.023	.134	.041	4.4	16
Dalton (Fire District)	Egypt Brook Reservoir	26	35	.016	.082	.013	1.3	11
	Cady Brook	28	48	.021	.083	.019	1.3	26
	Tap in town	23	40	.003	.071	.017	1.2	21
	Windsor Reservoir	33	48	.057	.128	.023	1.1	28
Danvers	Middleton Pond	47	41	.019	.177	.047	3.8	16
	Swan Pond	24	42	.039	.161	.042	3.6	19
Dartmouth	New Bedford Water Supply							
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	7	61	.001	.026	.006	1.3	42
East Bridgewater	Brockton Water Supply							
East Longmeadow	Springfield Water Supply							
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	0	43	.004	.017	.005	1.1	30
Erving (Millers Falls Water Supply Dist.)	Montague (Turners Falls Fire Dist.) Water Supply							

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorine	Hardness
				Free	Albuminoid			
					Total	Suspended		
EVERETT	Metropolitan Water Supply							
FALL RIVER	North Watuppa Lake	7	37	.017	.106	.025	5.5	11
Falmouth	Long Pond	2	36	.006	.071	.022	10.6	8
FITCHBURG	Ashby Reservoir	20	30	.069	.144	.052	1.8	9
	Scott Reservoir	7	31	.072	.122	.027	1.7	9
	Meetinghouse Pond	4	30	.055	.137	.032	2.0	10
	Wachusett Lake	6	27	.026	.136	.045	1.8	8
	Falulah Brook	20	30	.011	.100	.028	1.7	7
	Lovell Reservoir	17	29	.075	.127	.039	1.7	7
GARDNER	Crystal Lake	4	46	.027	.138	.033	3.6	24
GLOUCESTER	Haskell Reservoir	13	39	.011	.069	.018	8.0	6
	Dike's Reservoir	45	45	.054	.125	.027	8.6	6
	Wallace Reservoir	62	51	.019	.144	.039	9.1	
Great Barrington (Housatonic Water Works Co.)	Long Pond	4	80	.023	.156	.044	1.4	80
Great Barrington (Fire District)	East Mountain Reservoir	12	55	.046	.071	.021	1.3	34
Greenfield	Glen Brook Upper Reservoir	1	62	.009	.045	.017	1.7	40
	Glen Brook Lower Reservoir	2	58	.013	.046	.018	1.5	37
Groveland	Haverhill Water Supply							
Hadley (Water Supply District)	Hart's Brook Reservoir	8	47	.003	.051	.017	1.6	25
Hanson	Brockton Water Supply							
Hatfield	Running Gutter Brook Reservoir	11	71	.004	.032	.009	1.9	34
HAVERHILL	Millvale Reservoir	58	56	.027	.176	.044	4.5	25
	Johnson's Pond	18	55	.034	.135	.029	5.7	30
	Crystal Lake	14	39	.010	.129	.027	4.0	17
	Pentucket Lake	4	47	.026	.153	.043	4.5	23
	Kenoza Lake	19	51	.021	.125	.032	5.4	27
Hingham (Water Co.)	Accord Pond	17	37	.011	.126	.044	6.4	9
Hinsdale (Fire Dist.)	Reservoir	8	18	.002	.040	.014	1.4	10
Holbrook	Joint supply with Randolph							
Holden	Rutland Water Supply							
HOLYOKE	High Service Reservoir	8	40	.025	.109	.028	1.4	23
	Fomer Reservoir	23	34	.029	.140	.050	1.5	15
	Wright and Ashley ponds	8	49	.023	.091	.030	1.5	27
	White Reservoir	17	37	.038	.103	.037	1.4	18
	Whiting Street Reservoir	5	52	.031	.116	.032	1.7	32
Hopedale	Milford Water Supply							
Hudson	Gates Pond	6	33	.017	.110	.031	2.5	16
Hull	Hingham Water Supply							
Huntington (Fire District)	Cold Brook Reservoir	12	36	.002	.037	.009	1.3	14
Ipswich	Dow's Brook Reservoir	21	53	.014	.168	.050	6.9	23
	Bull Brook Reservoir	106	81	.022	.217	.049	7.3	30
Lancaster	Clinton Water Supply							
LAWRENCE	Merrimack River, filtered	36	52	.064	.104	–	5.6	16
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	4	48	.008	.034	.011	1.2	33
	Codding Brook Lower Reservoir	4	50	.006	.025	.008	1.2	33
	Basin Pond Brook	30	41	.006	.093	.026	1.0	19
Lenox (Water Co.)	Lower Root Reservoir	6	75	.005	.102	.043	1.2	60
	Woolsey Reservoir	2	64	.013	.043	.018	1.2	49
LEOMINSTER	Fall Brook Reservoir	13	29	.020	.086	.029	1.7	5
	Haynes Reservoir	13	25	.042	.145	.062	1.3	5
	Morse Reservoir	12	28	.039	.070	.016	1.6	5
	No-Town Reservoir	28	30	.017	.110	.023	1.4	6
Lexington	Metropolitan Water Supply							
Lincoln	Sandy Pond	5	29	.062	.093	.013	3.2	10
Longmeadow	Springfield Water Supply							
Ludlow	Springfield Water Supply							
LYNN	Breeds Pond	22	54	.035	.150	.030	6.9	23
	Birch Pond	6	50	.038	.145	.037	7.2	22
	Hawkes Pond	52	67	.066	.237	.046	7.0	32
	Walden Pond	44	60	.038	.187	.037	6.9	26
Lynnfield	Lynn Water Supply							
MALDEN	Metropolitan Water Supply							
Manchester	Gravel Pond	14	46	.010	.102	.026	8.6	16
MARLBOROUGH	Lake Williams	4	56	.073	.175	.049	5.6	25
	Millham Brook Reservoir	45	55	.066	.163	.029	4.1	18
Maynard	White Pond	1	29	.020	.107	.025	2.6	7
MEDFORD	Metropolitan Water Supply							
MELROSE	Metropolitan Water Supply							
Middleton	Joint supply with Danvers							
Milford (Water Co.)	Dug wells and Charles River, filtered	12	47	.004	.039	–	3.5	26
Milton	Metropolitan Water Supply							

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorine	Hardness
				Free	ALBUMINOID Total	ALBUMINOID Sus-pended		
Montague (Turners Falls Fire District)	Lake Pleasant	6	31	.011	.054	.015	1.4	13
Monterey (Water Co.)	Reservoir	4	84	.002	.019	.009	1.3	77
Nahant	Metropolitan Water Supply							
NEW BEDFORD	Great Quittacas Pond	40	42	.019	.149	.034	5.3	10
	Little Quittacas Pond	24	40	.029	.141	.043	5.4	11
NEWBURYPORT	Dug wells and Artichoke River, filtered	11	64	.013	.092	–	7.0	32
NORTH ADAMS	Broad Brook	9	38	.009	.046	.015	1.1	20
	Notch Brook Reservoir	4	71	.015	.030	.011	1.1	60
	Mount Williams Reservoir	2	75	.012	.046	.013	1.0	63
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	23	44	.030	.089	.026	1.5	22
	Mountain Street Reservoir	6	39	.022	.063	.020	1.2	24
North Andover	Great Pond	17	51	.017	.138	.027	4.8	23
Northborough	Lower Reservoir (Cold Harbor Brook)	80	47	.042	.182	.039	2.6	15
North Brookfield	Doane Pond	28	40	.134	.224	.055	2.4	12
	North Pond	31	37	.109	.196	.053	2.1	12
Northfield (Water Co.)	Reservoir—Northfield	19	37	.005	.025	.005	1.4	14
Northfield (Northfield Schools, Inc.)	Reservoir—East Northfield	12	49	.013	.049	.019	2.6	23
Norwood	Buckmaster Pond, filtered	9	58	.011	.095	–	6.1	25
Orange	Coolidge Brook Reservoir	25	34	.009	.092	.029	1.8	7
Palmer (Fire District No. 1.)	Lower Reservoir (Graves Brook)	19	40	.037	.080	.025	2.1	14
PEABODY	Spring Pond	11	53	.028	.136	.038	6.3	20
	Suntaug Lake	32	65	.051	.184	.034	7.6	23
Pembroke	Brockton Water Supply							
PITTSFIELD	Sackett Reservoir	7	68	.015	.049	.019	1.2	54
	Hathaway Reservoir	5	81	.012	.043	.018	1.3	69
	Ashley Reservoir	7	71	.005	.060	.026	1.4	60
	Ashley Lake	6	28	.039	.085	.025	1.2	17
	Farnham Reservoir	37	43	.093	.175	.053	1.2	18
	Mill Brook	24	48	.081	.101	.023	1.1	26
Plainville	No. Attleborough Water Supply							
Plymouth	Little South Pond	0	30	.048	.108	.033	6.6	4
	Great South Pond	0	29	.018	.079	.028	6.5	4
QUINCY	Metropolitan Water Supply							
Randolph	Great Pond	35	57	.028	.150	.033	7.5	18
REVERE	Metropolitan Water Supply							
Rockland	Joint supply with Abington							
Rockport	Cape Pond	42	85	.077	.249	.081	24.0	19
Russell	Black Brook Reservoir	15	37	.002	.042	.012	1.8	14
Rutland	Muschopauge Lake	4	36	.065	.120	.042	3.6	19
SALEM	Wenham Lake	30	72	.094	.183	.066	10.0	29
	Longham Reservoir	85	88	.136	.257	.070	9.3	29
	Ipswich River at pumping station	56	124	.079	.324	.170	8.7	57
Saugus	Lynn Water Supply							
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	9	58	.003	.029	.012	1.2	39
SOMERVILLE	Metropolitan Water Supply							
Southborough	Sudbury Reservoir	17	41	.018	.101	.023	3.4	18
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	18	32	.022	.095	.024	2.1	9
	Hatchet Brook Reservoir No. 4	21	31	.037	.121	.034	2.2	10
So. Hadley (So. Hadley Falls Fire Dist. No. 1)	Buttery Brook Reservoir	13	46	.044	.081	.028	3.3	20
	Leaping Well Reservoir	3	31	.025	.095	.049	2.0	13
Southwick	Springfield Water Supply							
Spencer	Shaw Pond	8	27	.009	.088	.017	2.0	9
SPRINGFIELD	Cobble Mountain Reservoir	26	35	.036	.118	.038	1.3	13
	Westfield Little River, filtered	11	34	.001	.045	–	1.3	14
Stockbridge (Water Co.)	Lake Averic	6	68	.019	.094	.018	1.4	48
Stoneham	Metropolitan Water Supply							
Stoughton	Muddy Pond	12	40	.006	.045	.012	3.5	11
Sunderland	Saw Mill Brook Reservoir	5	62	.002	.014	–	1.6	40
Swampscott	Metropolitan Water Supply							
TAUNTON	Assawompsett Pond	25	40	.035	.157	.046	5.0	9
	Elder's Pond	7	33	.018	.115	.028	4.9	9
Wakefield	Crystal Lake, filtered	6	70	.009	.118	–	8.6	34
Wareham (Onset Fire District)	Jonathan Pond	5	30	.007	.098	.027	5.9	7
Watertown	Metropolitan Water Supply							
West Bridgewater	Brockton Water Supply							
WESTFIELD	Montgomery Reservoir	37	32	.027	.114	.021	1.3	7
	Winchell Reservoir	13	29	.027	.064	.022	1.4	6
	New Granville Reservoir	12	31	.062	.070	.024	1.5	8
Westhampton (Water Co.)	Reservoir	6	38	.003	.033	.013	1.5	20

Averages of Chemical Analyses of Surface-Water Sources, etc.—Concluded

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorine	Hardness
				Free	Albuminoid			
					Total	Suspended		
West Springfield	Bear Hole Brook Reservoir	10	70	.020	.076	.031	1.7	42
	Bear Hole Brook Reservoir, filtered	4	69	.009	.021	-	1.8	42
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	5	57	.002	.019	.005	1.3	34
Weymouth	Great Pond	42	43	.020	.128	.028	5.8	11
Whitman	Brockton Water Supply							
Wilbraham	Springfield Water Supply							
Williamsburg	Reservoir	11	46	.011	.057	.015	1.3	26
Williamstown (Water Co.)	Paul Brook	0	94	.004	.018	.007	1.1	76
	Rattlesnake Brook Reservoir	2	82	.012	.026	.015	1.1	79
Winchester	North Reservoir	3	41	.028	.108	.028	4.2	22
	Middle Reservoir	5	34	.028	.148	.035	4.0	18
	South Reservoir	6	39	.028	.086	.014	4.2	20
Winthrop	Metropolitan Water Supply							
WORCESTER	Pine Hill Reservoir	13	33	.060	.135	.042	2.4	16
	Upper Holden Reservoir	9	31	.015	.103	.034	2.1	11
	Lower Holden Reservoir	7	32	.009	.091	.027	2.1	12
	Leicester Reservoir	17	38	.036	.132	.038	2.2	15
	Bottomly Reservoir	32	48	.036	.189	.056	2.5	20
	Kent Reservoir	25	40	.045	.164	.043	2.6	19
	Mann Reservoir	18	38	.015	.131	.032	2.3	18
	Kendall Reservoir	9	31	.026	.109	.036	2.4	16
	Quinapoxet Pond	33	35	.018	.123	.034	2.0	13

Averages of Chemical Analyses of Ground-Water Sources for the Year 1934

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorine	Nitrogen as —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Acton (West and South Water Supply District)	Tubular wells	0	103	.001	.006	7.0	1.460	.000	44	.06
Adams (Fire District)	Tubular wells	0	132	.000	.014	1.0	.400	.000	131	.05
Amesbury	Tubular wells	14	141	.076	.027	6.0	.020	.000	67	5.57
	Tubular wells, filtered	1	127	.000	.018	5.5	.020	.000	69	.07
Ashland	New tubular wells	2	57	.003	.025	4.0	.050	.000	26	.17
ATTLEBORO	Dug wells and filtered water, South Attleboro	1	47	.005	.020	4.6	.030	.000	28	.06
	Tubular wells, West Mansfield	3	48	.027	.019	4.4	.020	.000	21	.98
Auburn (Water Co.)	Tubular wells	0	108	.000	.009	9.1	1.567	.000	52	.05
Avon	Dug and tubular wells	2	82	.001	.012	6.2	1.104	.000	38	.10
Ayer	Dug well	1	86	.001	.006	7.9	1.250	.000	37	.10
	Tubular wells	2	73	.009	.010	5.1	.023	.000	41	.51
Barnstable (Water Co.)	Tubular wells (old supply)	0	42	.003	.008	11.0	.020	.000	9	.13
Bedford	Dug well	1	37	.000	.013	3.7	.020	.000	17	.05
	Tubular wells	1	45	.000	.005	3.7	.035	.000	17	.39
Belchertown (Water District)	Tubular wells	0	69	.000	.005	4.3	.135	.000	31	.07
Billerica	Gravel-packed wells—Tap in pumping station	23	77	.100	.080	8.5	.020	.000	31	.30
Bourne (Monument Beach)	Tubular wells	1	46	.000	.007	10.1	.367	.000	15	.05
Bridgewater	Tubular wells	0	70	.005	.006	6.6	1.600	.000	24	.08
Brookline	Tubular wells and filter gallery, filtered	7	92	.009	.042	7.8	.202	.002	42	.08
Canton	Henry's Spring well	6	63	.006	.019	6.7	.675	.000	28	.08
	Ward well	4	65	.015	.025	6.1	.355	.000	31	.10
	Springdale well	4	68	.003	.016	5.9	.250	.000	27	.10
Chatham (Water Co.)	Filter gallery near White Pond	5	48	.007	.081	17.9	.020	.000	8	.07
	Tubular wells	0	45	.003	.005	13.0	.020	.000	11	.05
Chelmsford (North Chelmsford Fire District)	Tubular wells	12	50	.123	.065	4.2	.220	.000	24	.35
Chelmsford (Water District)	Tubular wells	3	80	.007	.018	6.4	.875	.003	37	.20
Cohasset (Water Co.)	Tubular wells, Elms Meadow	1	140	.003	.023	18.9	1.433	.000	56	.07
	Dug well, filtered	19	74	.048	.072	11.1	.020	.000	23	.23
Cummington	Springs, tap	0	47	.001	.003	2.9	1.300	.000	24	.08
Dedham (Water Co.)	Dug and tubular wells	6	101	.011	.035	9.8	.817	.000	43	.10
Deerfield (Fire District)	Springs	0	54	.000	.005	2.0	.020	.000	28	.05
Douglas	Tubular wells	0	55	.000	.006	3.9	.625	.000	26	.07
Dracut (Water Supply District)	Tubular wells, Dracut	10	132	.016	.037	8.7	1.500	.000	61	.19
	Tubular wells, Collinsville	3	66	.004	.018	2.7	.025	.000	30	.07
Dudley	Tubular wells	0	39	.000	.006	3.1	.020	.000	17	.11
Dunstable	Dug and tubular wells	1	58	.001	.006	3.1	1.600	.000	29	.09
Duxbury (Fire and Water District)	Tubular wells	0	45	.000	.002	9.3	.023	.000	11	.05
East Brookfield	Dug well	0	27	.000	.007	2.2	.020	.000	10	.05
Easthampton	Tubular wells	2	78	.000	.003	2.1	.243	.000	44	.05
Easton (North Easton Village District)	Dug well	8	50	.001	.022	4.8	.322	.000	23	.37
Easton (Unionville Fire and Water Dist.)	North Easton Village District Water Supply									
Edgartown (Water Co.)	Dug and tubular wells	0	31	.002	.004	9.8	.020	.000	7	.08
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	25	77	.002	.065	9.3	.383	.000	30	.22
	Tubular wells near Mattapoisett River	0	61	.001	.022	8.6	.583	.000	24	.09

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albu-minoid		Nitrates	Nitrites		
Foxborough	Tubular wells	0	57	.000	.010	5.0	.533	.000	26	.12
Framingham	Tap in pumping station	11	67	.163	.092	9.2	–	–	33	.19
Franklin	Tubular wells	1	50	.000	.010	4.7	.030	.000	22	.17
Gill (Riverside Water Co.)	Spring	2	72	.001	.011	2.4	1.025	.000	42	.08
Grafton (Water Co.)	Gravel-packed well at North Grafton	0	64	.018	.009	6.4	.467	.005	33	.09
	Dug wells at Grafton	0	109	.000	.013	11.1	2.100	.000	46	.08
Granville (Water Co.)	Well and springs	1	32	.000	.015	1.7	.020	.000	14	.10
Great Barrington (Fire District)	Dug well near Green River	0	95	.000	.005	1.2	.039	.000	76	.05
	Filter gallery near Green River	0	95	.001	.011	1.5	.040	.000	77	.05
Greenfield	Dug well near Green River	5	62	.001	.012	1.3	.020	.000	44	.14
Groton (Water Co.)	Dug well	3	70	.023	.017	2.5	.020	.000	41	.31
Groton (West Groton Water Supply District)	Tubular wells	0	52	.001	.007	2.2	.042	.000	31	.07
Hanover	Tubular wells	0	63	.001	.006	7.4	.027	.000	25	.09
Hardwick (Center)	Dug well	1	35	.003	.006	2.0	.023	.000	18	.46
Hardwick (Gilbertville)	Dug and tubular wells	1	73	.000	.006	1.8	.020	.000	44	.09
Hardwick (Wheelwright)	Tubular wells	0	43	.001	.005	3.3	.400	.000	9	.08
Hingham (Water Co.)	Filter galleries	17	76	.004	.037	7.4	.147	.000	38	.11
Holliston (Water Co)	Large well	26	53	.025	.073	3.9	.020	.000	25	.94
Hopedale	Milford Water Supply									
Hopkinton	New tubular wells	0	68	.002	.008	4.2	.833	.001	30	.07
Hull	Hingham Water Supply									
Kingston	Tubular wells	0	42	.001	.004	7.5	.027	.000	14	.06
Leicester (Water Supply District)	Dug wells	4	63	.001	.015	3.0	.833	.000	33	.08
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	29	51	.036	.093	3.0	.023	.000	24	.15
Littleton	Tubular wells	0	36	.000	.004	2.2	.033	.000	21	.05
LOWELL	Boulevard wells, filtered	11	58	.002	.021	4.5	.309	.000	27	.24
Manchester	Dug and tubular wells	2	92	.001	.019	15.1	.703	.000	36	.11
Mansfield	Dug well	0	43	.001	.005	3.5	.027	.000	17	.10
Marblehead	Inlet of filter	10	174	.051	.046	21.9	.022	.000	83	1.89
	Dug and tubular wells, filtered	10	174	.002	.032	21.7	.065	.000	87	.22
Marion	Old tubular wells	0	45	.001	.007	7.0	.225	.000	20	.05
	New tubular wells	0	101	.002	.006	21.4	.200	.000	43	.08
Marshfield	Tubular wells	2	49	.001	.004	7.7	.020	.000	11	.07
Mattapoisett	Tubular wells	0	62	.000	.006	8.2	.020	.000	24	.09
Medfield	Tubular wells, tap in town	1	69	.001	.018	4.1	.065	.000	35	.08
Medway	Tubular wells	1	78	.035	.013	9.3	.484	.000	37	.13
Merrimac	Tubular wells	0	87	.004	.008	6.3	.187	.000	38	.14
Methuen	Tubular wells at Pine Island	0	115	.069	.010	9.1	1.757	.002	63	.09
	Lone Tree Hill wells	3	75	.249	.035	6.0	.234	.008	39	.07
Middleborough	Dug well, filtered	9	64	.004	.014	6.7	.230	.000	29	.31
Millbury (Water Co.)	Dug well	1	45	.001	.018	2.8	.027	.000	21	.06
Millis	Dug wells	0	130	.001	.007	11.4	2.090	.000	65	.06
Monson	Old dug well	13	35	.003	.034	1.9	.020	.000	11	.10
	New dug well	0	32	.008	.008	2.0	.020	.000	11	.06
Montague (Montague Village)	Montague Village Springs	3	49	.002	.028	2.0	.023	.000	27	.15
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	0	58	.001	.004	17.6	.020	.000	17	.05
Nantucket (Siasconset)	Dug wells	1	61	.000	.005	17.8	.020	.000	19	.60
Natick	Dug well	0	113	.001	.007	11.5	.476	.000	58	.06

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorine	Nitrogen as —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Needham	Dug well No. 1	1	85	.001	.022	8.3	1.267	.000	39	.06
	Dug well No. 2	0	83	.000	.014	7.5	.783	.000	39	.06
	Tubular wells (Great Plain Avenue)	1	75	.005	.022	8.2	.425	.000	35	.13
NEWTON	Tap in pumping station. (Treated water)	1	113	.004	.016	7.4	.137	.000	30	.10
	Dug well No. 1	0	75	.002	.013	6.6	.045	.000	36	.07
	Dug well No. 2	0	70	.002	.024	7.1	.060	.000	34	.05
North Attleborough	Dug wells	3	58	.001	.011	5.6	.205	.000	32	.20
Northbridge	Tubular wells (Meadow Pond)	0	42	.004	.010	3.8	.145	.000	18	.11
	Tubular wells (Cook Allen)	0	48	.003	.011	3.7	.060	.000	17	.05
Norton	Tubular wells	0	47	.000	.005	3.3	.020	.000	18	.18
Norwood	Tubular wells	7	97	.006	.015	7.4	.574	.000	40	2.80
Oak Bluffs (Cottage City Water Co.)	Springs	0	40	.062	.055	9.2	.157	.000	12	.07
Orange	Crystal Spring	6	34	.006	.021	2.3	–	–	11	.11
Oxford (Water Co.)	Tubular wells	0	51	.001	.007	3.7	.367	.000	25	.05
Palmer (Bondsville Water Co.)	Tubular wells	1	65	.000	.007	3.5	.250	.000	27	1.98
Pepperell	Tubular wells	0	38	.000	.004	2.0	.020	.000	17	.04
Provincetown	Tubular wells	1	163	.006	.005	66.1	.020	.000	36	.34
Reading	New tubular wells	2	76	.002	.013	5.4	.117	.000	37	.29
Rockport	Tubular wells	0	85	.000	.012	15.8	.930	.000	29	.20
Salisbury (Water Supply Co.)	Old dug well	5	88	.001	.013	6.4	.033	.000	40	.21
	New dug well	10	93	.001	.007	6.6	.020	.000	52	.76
Scituate	Webster Meadow wells	0	169	.000	.008	35.5	1.171	.000	73	.15
	Bound Brook well	26	107	.001	.073	16.3	.533	.000	45	.09
Sharon	Dug well	0	205	.001	.012	36.7	2.775	.004	92	.05
	Tubular wells	2	66	.002	.011	6.6	.600	.000	26	.18
Sheffield (Water Co.)	Smith's Spring	0	33	.000	.004	1.3	.020	.000	21	.06
	Clark's Spring	9	44	.026	.030	1.5	.020	.000	25	.08
Shirley	Dug wells	0	59	.000	.007	6.1	2.200	.000	26	.05
Shrewsbury	Tubular wells (South Street)	2	59	.007	.011	3.7	.235	.000	29	0.9
	Tubular wells (Oak Street)	0	54	.001	.007	4.4	.140	.000	26	.05
Somerset	Tubular wells	12	133	.001	.022	6.4	.080	.000	34	.43
South Hadley (Fire District No. 2)	Dug wells	0	57	.005	.006	2.5	.283	.000	32	.05
Sturbridge	Tubular wells	2	58	.000	.005	3.6	.219	.000	23	.41
Sutton (Water Co.)	Tubular wells	2	102	.004	.015	4.5	.900	.000	53	.12
Tisbury	Tashmoo Spring	0	43	.000	.003	10.4	.020	.000	10	.05
Uxbridge	Tubular wells	0	69	.007	.011	6.8	1.100	.000	31	.04
Walpole	Tubular wells	0	58	.002	.018	4.7	.333	.000	26	.07
WALTHAM	Old dug well	6	102	.055	.021	9.7	.072	.000	48	1.20
	New dug well	0	73	.003	.018	6.6	.162	.000	38	.06
Ware	Dug and tubular wells	0	96	.006	.007	6.4	1.486	.000	41	.12
Wareham (Wareham Fire District)	Tubular wells	0	35	.002	.005	6.5	.020	.000	9	.05
Warren (Water District)	Tubular wells	0	35	.001	.009	2.7	.200	.000	13	.07
Warren (West Warren Water Co.)	Dug wells	8	53	.000	.017	2.1	.042	.000	20	.19
Wayland	Tubular wells	0	103	.003	.008	6.3	.917	.000	47	.08
Webster	Dug and tubular wells	0	49	.009	.005	3.4	.165	.000	25	.09
Wellesley	Tubular wells at pumping station No. 1	0	93	.004	.014	8.7	.525	.000	41	.18
	Dug well at pumping station No.2	0	81	.000	.008	7.4	.575	.000	36	.06
	Large tubular well at pumping station No. 3	0	81	.001	.006	6.6	.750	.000	34	.08
Westborough	Filter basin	3	34	.010	.058	2.9	–	–	14	.12
West Brookfield	Tubular wells	0	44	.001	.005	2.6	.023	.000	17	.06
Westford (Water Co.)	Tubular wells (Westford)	0	57	.000	.006	2.2	.020	.000	29	.05
Weston	Tubular wells at Warren Avenue	2	103	.003	.012	6.6	2.200	.000	46	.22
	Tubular wells at Kendal Green	0	78	.000	.007	6.5	.575	.000	36	.05

Averages of Chemical Analyses of Ground-Water Sources, etc.—Concluded

[Parts per Million]

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorine	Nitrogen as—		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	0	110	.001	.012	1.1	.020	.000	89	.04
	Blake's Spring	0	134	.013	.006	1.0	.020	.000	115	.05
Westwood	Dedham Water Supply									
Williamstown (Water Co.)	Cold Spring	1	142	.014	.008	1.0	.333	.000	142	.05
	Sherman Spring	1	108	.002	.005	1.1	.047	.000	91	.05
Wilmington	Tubular wells	0	64	.001	.007	5.9	.515	.000	28	.05
Winchendon	Old dug well	45	38	.047	.063	1.8	.020	.000	16	2.07
	New dug well	16	29	.022	.044	1.7	.020	.000	15	.29
WOBURN	Gravel-packed well A	2	135	.019	.034	13.1	.287	.000	64	.05
	Gravel-packed well B	1	129	.063	.030	13.4	.140	.000	65	.05
	Gravel-packed well C	1	101	.003	.019	9.3	.333	.000	49	.06
	Gravel-packed well D	0	79	.006	.018	8.2	.093	.000	40	.05
Worthington	Springs	4	27	.005	.035	1.3	.020	.000	17	.16
Wrentham	Dug and tubular wells	0	64	.000	.005	4.7	2.400	.000	31	.06
Yarmouth	Tubular wells	0	45	.000	.004	13.7	.020	.000	10	.07

Sanitary Protection of Public Water Supplies

During the year 1934 rules and regulations were adopted by the Department in accordance with Section 160 of Chapter 111 of the General Laws for the sanitary protection of the waters used as sources of water supply by the city of Brockton and the towns of Athol, Hatfield, Manchester, Northborough and Spencer and the Colrain Fire District in Colrain.

The cities, towns, fire and water districts, and water companies, for which rules and regulations have been adopted by the department are as follows:

Abington and Rockland	1927
Adams (Fire District)	1921
Amherst (Water Company)	1931
Andover	1908
Ashburnham	1922
Ashfield (Water Company)	1923
Athol	1934
Attleboro	1926
Braintree	1913, 1926
Brockton	1905, 1934
Cambridge	1899
Cheshire (Water Company)	1933
Chester (Fire District)	1914
Chicopee	1906
Cohasset (Water Company)	1923
Colrain (Fire District)	1932, 1934
Concord	1910
Dalton (Fire District)	1919
Danvers and Middleton	1920
Deerfield (So. Deerfield Water Supply District)	1932
Easthampton	1904
Egremont (So. Egremont Water Company)	1932
Fall River	1907
Falmouth	1930
Fitchburg	1903, 1907, 1918
Gardner	1910
Gloucester	1930
Great Barrington (Housatonic Water Works Company)	1929
Greenfield	1904
Hatfield	1934
Haverhill	1921
Hingham and Hull (Hingham Water Company)	1912
Holden	1914
Holyoke	1908, 1918
Hudson	1929
Lakeville (State Sanatorium)	1926
Lee (Berkshire Water Company)	1919
Leicester (Cherry Valley and Rochdale Water District)	1914
Lenox (Water Company)	1933
Leominster	1919, 1927
Lincoln and Concord	1903
Lynn	1907
Manchester	1934
Marlborough	1901
Maynard	1907
Medfield (State Hospital)	1922
Metropolitan Water District	1925
Milford (Water Company)	1924
Montague (Turners Falls Fire Dist.)	1908

New Bedford	1932
Newburyport	1921
Norfolk (State Hospital)	1926
Northampton	1904
North Andover	1912
Northborough	1905, 1934
Norwood	1901
Palmer (Fire District No. 1)	1933
Peabody	1922
Pittsfield	1903, 1909
Plymouth	1908
Randolph and Holbrook	1926
Rockport	1902
Russell	1910
Rutland	1914
Salem and Beverly	1901
Scituate	1927
Southbridge (Southbridge Water Supply Company)	1931
Spencer	1934
Springfield	1904, 1910
Stockbridge (Water Company)	1910
Taunton	1932
Wakefield	1904
Westborough	1929
Westfield	1922
West Springfield	1907
Weymouth	1903
Williamsburg	1914
Winchester	1909
Worcester	1926

The Department during the year has received 6 applications for its approval of the acquisition of land for protecting sources of water supply. In cases where request for the approval of the purchase or taking was in accordance with Chapter 40, Section 41, of the General Laws, hearings were given by the Department under that section. The following takings were approved by the Department:

Purchase of Land During the Year 1934 for the Purpose of Protecting Sources of Water Supply

City or Town	Source of Supply	Approximate Area of Land in Proposed Taking (Acres)
Holyoke	Fomer Reservoir—Manhan River	426.0
Salem and Beverly Water Supply Board	Wenham Lake	40.0
Spencer	Shaw Pond	60.35
Warren	Tubular Wells	76.25
Montague (Turners Falls Fire District)	Lake Pleasant	8.0
West Springfield	Black Brook	75.0

Consumption of Water

In general there was an increase in the water consumption during the year 1934 over that of the year 1933, and in the Metropolitan Water District the increase was about 6.8 per cent. Much of this increase resulted during the winter months from the waste of water in preventing freezing but there was considerable increase during the months of June to September, inclusive, because of the large amount of water used in irrigation especially during the extremely dry months of July and August.

The average daily water consumption in the various cities and towns where records are kept and supplied to this Department, the estimated population in these cities and towns and the per capita water consumption are shown in the following table:

Average Daily Consumption of Water in Various Cities and Towns in 1934

City or Town	Estimated Population	Gallons	Gallons per Inhabitant	City or Town	Estimated Population	Gallons	Gallons per Inhabitant
Metropolitan Water District				Melrose	25,574	1,706,000	67
Arlington	45,015	2,212,000	49	Milton	19,292	945,000	49
Belmont	26,942	1,426,000	53	Nahant	1,673	269,000	161
Boston	782,442	89,257,000	114	Quincy	81,525	4,995,000	61
Chelsea	45,816	3,480,000	76	Revere	37,613	2,269,000	60
Everett	53,506	4,575,000	86	Somerville	107,809	9,163,000	85
Lexington	10,813	668,000	62	Stoneham	10,840	904,000	83
Malden	63,033	4,012,000	64	Swampscott	11,460	937,000	82
Medford	69,384	3,347,000	48	Watertown	42,457	2,286,000	54
				Winthrop	17,407	1,188,000	68

Average Daily Consumption of Water in Various Cities and Towns in 1934

City or Town	Estimated Population	Gallons	Gallons per Inhabitant
Abington and Rockland	13,396	656,000	49
Acton	2,558	110,000	43
Acushnet	4,092	77,000	19
Agawam	7,739	335,000	43
Amesbury	12,435	665,000	53
Amherst	5,888	602,000	102
Andover	9,969	987,000	99
Ashland	2,397	194,000	81
Athol	11,537	680,000	59
ATTLEBORO	22,686	1,206,000	53
Avon	2,457	128,000	52
Ayer	3,082	201,000	65
Barnstable	7,271	481,000	66
Bedford	3,474	143,000	41
Belchertown	3,327	27,000	8
BEVERLY	27,007	1,628,000	60
Billerica	6,654	282,000	42
Braintree	17,728	1,131,000	64
Brigdewater	9,055	214,000	24
BROCKTON	63,797	3,246,000	51
Brookfield	1,352	30,000	22
Brookline	51,338	4,847,00	94
CAMBRIDGE	113,643	12,226,000	108
Canton	5,816	682,000	117
Chatham	2,083	114,000	55
Chelmsford	7,381	225,000	30
CHICOPEE	45,568	3,502,000	77
Clinton	12,817	1,046,000	82
Cohasset	3,219	354,000	110
Concord	7,813	642,000	82
Dalton	4,322	1,211,000	280
Danvers and Middleton	15,632	1,321,000	85
Dartmouth	8,778	266,000	30
Dedham	16,110	1,499,000	93
Douglas	2,195	194,000	88
Dracut	7,322	199,000	27
Dudley	4,265	179,000	42
Duxbury	1,703	234,000	137
East Bridgewater	3,634	165,000	45
East Brookfield	926	40,000	43
Easthampton	11,323	832,000	73
East Longmeadow	3,481	83,000	24
Easton	5,298	264,000	50
Edgartown	1,309	161,000	123
Fairhaven	11,050	419,000	38
FALL RIVER	115,274	6,476,000	56
Falmouth	4,923	914,000	186
FITCHBURG	40,692	4,367,000	107
Framingham	23,116	1,526,000	66
Franklin	7,028	628,000	89
GARDNER	19,934	992,000	50
GLOUCESTER	24,867	1,939,000	78
Grafton	7,076	109,000	15
Greenfield	15,703	1,348,000	86
Groton	2,439	235,000	96
Groveland	2,336	63,000	27
Hanover	2,850	119,000	42
Hanson and Pembroke	3,700	104,000	28
HAVERHILL	48,710	4,011,000	82
Holden	4,219	297,000	70
Holliston	2,906	95,000	33
HOLYOKE	56,537	7,314,000	129
Hudson	8,740	398,000	46
Ipswich	5,599	271,000	48
Kingston	2,790	249,000	89
Lancaster	3,072	105,000	34
LAWRENCE	85,068	5,442,000	64
Lenox	2,742	300,000	109
Littleton	1,476	74,000	50
Longmeadow	5,320	192,000	36
LOWELL	100,234	5,752,000	57
Ludlow	8,935	298,000	33
LYNN	102,320	7,499,000	73
Lynnfield	1,804	48,000	27
Manchester	2,746	422,000	154
Mansfield	6,364	512,000	80
Marblehead	9,032	813,000	90
Marion	1,932	221,000	114
MARLBOROUGH	15,587	711,000	46
Marshfield	1,625	263,000	162
Mattapoisett	1,501	123,000	82
Maynard	7,156	339,000	47
Medfield	4,225	63,000	15
Medway	3,160	206,000	65
Merrimac	2,426	197,000	81
Methuen	21,441	1,251,000	58
Middleborough	8,608	325,000	38
Milford and Hopedale	17,714	854,000	48
Millbury	7,370	777,000	105
Millis	1,738	176,000	101
Montague and Erving	9,374	870,000	93
Nantucket	4,099	604,000	147
Natick	14,163	797,000	56
Needham	12,339	803,000	65
NEW BEDFORD	112,597	9,013,000	80
NEWBURYPORT	15,084	1,379,000	91
NEWTON	75,094	4,650,000	62
NORTH ADAMS	21,621	2,423,000	112
North Andover	7,059	523,000	74
North Attleborough	10,523	757,000	72
Northbridge	9,713	710,000	73
North Brookfield	3,013	314,000	104
Norton	2,737	127,000	46
Norwood	15,767	1,165,000	74
Oak Bluffs	1,348	155,000	115
Oxford	3,943	240,000	61
PEABODY	22,525	2,704,000	120
Pepperell	3,036	250,000	82
PITTSFIELD	51,917	5,641,000	109
Plainville	1,640	97,000	59
Plymouth	13,042	1,190,000	91
Provincetown	3,905	503,000	129
Randolph and Holbrook	10,697	649,000	61
Reading	10,626	606,000	57
Rockport	3,630	419,000	115
Rutland	2,607	229,000	88
SALEM	43,780	4,971,000	114
Salisbury	2,493	208,000	83
Saugus	16,275	992,000	61
Scituate	3,442	582,000	169
Sharon	3,537	311,000	88
Shelburne	1,549	84,000	54
Shirley	2,453	89,000	36
Shrewsbury	7,782	304,000	39
Somerset	5,862	175,000	30
Southborough	2,256	74,000	33
Southbridge	14,264	999,000	70
Southwick	1,617	26,000	16
SPRINGFIELD	156,168	14,245,000	91
Stockbridge	1,762	255,000	128
Stoughton	8,482	659,000	78
Sturbridge	1,772	33,000	19
TAUNTON	37,355	2,782,000	74
Tisbury	1,629	272,000	167
Uxbridge	6,376	235,000	37
Wakefield	16,884	824,000	49
Walpole	7,885	1,081,000	137
WALTHAM	42,848	2,318,000	54
Ware	7,385	360,000	49
Wareham	5,760	363,000	63
Warren	3,765	77,000	20
Wayland	3,402	316,000	93
Webster	12,992	643,000	49
Wellesley	13,351	1,016,000	76
West Bridgewater	3,274	189,000	58
West Brookfield	1,255	53,000	42
WESTFIELD	20,121	1,873,000	93
Westford	3,623	168,000	46
Weston	3,673	226,000	62
West Springfield	17,770	1,826,000	103
Weymouth	23,785	1,730,000	73
Whitman	7,638	291,000	38
Wilbraham	2,719	42,000	16
Wilmington	4,411	167,000	38
Winchester	13,642	1,023,000	75
WOBURN	20,284	1,906,000	94
WORCESTER	198,954	14,871,000	75
Wrentham	3,880	176,000	45
Yarmouth	2,004	51,000	25

There were no shortages in any of the sources of water supply in the State during the year and it was not necessary for the Metropolitan District Water Supply Commission to divert water through its tunnel from the Ware River into Wachusett Reservoir. The yield of that reservoir and of the other sources of supply of the district was sufficient to meet all of the water supply requirements of the district and to allow a wastage over the dam at Clinton from March 31 to about July 1 of 11,502.2 million gallons. At the end of the year 1934 the water in this reservoir was 5.35 feet below the crest of the dam which represents 1205.4 million gallons of storage in this reservoir. The progress in the construction of the new sources of water supply for the Metropolitan Water District in connection with the diversion of the waters of the Swift and Ware rivers has been satisfactory during the year and by the end of the year the tunnel for diverting the waters of the Swift and Ware rivers had been completed except for about 1,000 feet of lining. There is some work to be completed in the Swift River intake, and there still remains considerable work in connection with the Quabbin Reservoir on the Swift River.

CLIMATOLOGICAL DATA

Temperature

The extreme cold weather in December, 1933, and February, 1934, was undoubtedly the direct cause for a considerable increase in water drawn from the various supplies of the State. The cumulative daily mean temperatures in the vicinity of Boston for the winter of 1933–1934 show a deficiency of 449 degrees when compared with the normal. There were nine consecutive days, February 2 to February 11, when the maximum temperature did not rise above 30 degrees. During the winter of 1917–18, which was the coldest winter since 1871, there was a temperature deficiency of 532 degrees and during January and February of that winter there were fifteen consecutive days when the maximum temperature did not reach 30 degrees.

The monthly normal and actual mean temperatures for the vicinity of Boston for 1934 are shown in the following table.

	DEGREES F.			DEGREES F.	
	Normal	1934		Normal	1934
January	27.9	29.6	July	71.7	73.2
February	28.8	17.5	August	69.9	67.3
March	35.6	35.1	September	63.2	64.6
April	46.4	48.0	October	53.6	49.6
May	57.1	60.6	November	42.0	45.6
June	66.5	66.9	December	32.5	28.4

The following table has been prepared to show the monthly mean and the maximum and minimum temperature for each month in 1934 at Boston, Worcester, Amherst and Pittsfield.

Temperatures
(Degrees Fahrenheit)

1934	BOSTON			WORCESTER			AMHERST			PITTSFIELD		
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
January	30	56	−2	22	54	−5	24	43	−5	23	46	−12
February	18	44	−18	14	44	−20	12	37	−22	10	42	−23
March	35	68	6	32	64	1	31	61	5	30	57	−2
April	48	72	32	47	73	25	46	73	25	45	74	23
May	61	87	41	59	87	31	59	86	32	59	88	29
June	67	94	50	67	92	38	68	93	39	67	93	39
July	73	93	57	72	93	48	72	92	48	72	96	47
August	67	86	50	65	85	40	65	89	38	65	90	36
September	65	81	52	64	85	38	65	83	42	62	82	39
October	50	71	32	48	74	25	48	72	28	45	69	24
November	46	69	23	43	71	17	43	67	12	40	65	17
December	28	65	3	26	61	0	26	64	2	24	62	−2
Year	49	94	−18	47	93	−20	47	93	−22	45	96	−23
Normal	50 (46 yrs.)			48 (38 yrs.)			47 (46 yrs.)			46 (14 yrs.)		

Rainfall

The average rainfall in the State for the year ending December 31, 1934, as recorded at seven long-term stations located in different parts of the State, was 44.05 inches which is about 0.57 of an inch less than the normal. There were deficiencies in rainfall during the months of January, May, July, August, October, November and December. The cumulated rainfall from January 1 to July 1 was 1.68 inches in excess of the normal but in July and August the deficiency of 3.81 inches occurred which, except for the excessive rainfall in September, probably would have caused shortages in water in some of the smaller supplies of the State where only limited storage facilities are available. During the climatological year ending September 30, 1934, there was a deficiency of rainfall of 1.26 inches. The following table shows the normal rainfall as deduced from the records of seven widely-distributed stations having records for more than sixty years; also, the rainfall for the year 1934, and the excess or deficiency of precipitation during each month as compared with the normal:

MONTH	Normal Rainfall (Inches)	Rainfall in 1934 (Inches)	Excess or Deficiency in 1934 (Inches)
January	3.74	3.60	—0.14
February	3.58	3.63	+0.05
March	3.95	4.26	+0.31
April	3.70	4.19	+0.49
May	3.66	3.45	—0.21
June	3.33	4.51	+1.18
July	3.73	1.77	—1.96
August	4.16	2.31	—1.85
September	3.57	6.68	+3.11
October	3.70	3.25	—0.45
November	3.84	3.22	—0.62
December	3.66	3.18	—0.48
Totals	44.62	44.05	—0.57

FLOW OF STREAMS

In those streams where records have been kept by this Department for a number of years the average flow during 1934 has been somewhat greater than the normal.

Sudbury River

The average yield of the Sudbury River in the year 1934 was 1.584 cubic feet per second, or 1,024,000 gallons per day, per square mile of drainage area. The normal flow of this stream for the sixty years during which records have been maintained is 1.501 cubic feet per second, or 970,000 gallons per day, per square mile. The average daily yield for the past year during the six driest months, June to November, inclusive, was 424,000 gallons per day per square mile, or 7.8 per cent more than the normal.

The following table shows the relation between the average daily yield of the Sudbury River per square mile in each month of the year 1934 and the normal yield of the river during the past sixty years. The drainage area of the Sudbury River at the point of measurement is 75.2 square miles.

Sudbury River

Table showing the Average Daily Yield of the Sudbury River for Each Month in the Year 1934, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1934		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.724	1.114	2.629	1.699	+ .905	+ .585
February	2.310	1.493	.721	.466	—1.589	—1.027
March	4.111	2.657	4.146	2.680	+ .035	+ .023
April	3.096	2.001	4.236	2.738	+1.140	+ .737
May	1.683	1.088	1.980	1.280	+ .297	+ .192
June	.795	.514	.709	.458	— .086	— .056
July	.301	.194	— .053	— .034	— .354	— .228
August	.325	.210	— .050	— .033	— .375	— .243
September	.421	.272	1.263	.816	+ .842	+ .544
October	.625	.404	1.162	.751	+ .537	+ .347
November	1.206	.780	.937	.605	— .269	— .175
December	1.466	.947	1.276	.825	— .190	— .122
Average for whole year	1.501	.970	1.584	1.024	+ .083	+ .054

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years, 1929–1934, inclusive, together with the average for a period of sixty years, are given in the following table:

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area

MONTH	1929			1930			1931		
	Rain-fall	Rain-fall col-lected	Per Cent col-lected	Rain-fall	Rain-fall col-lected	Per Cent col-lected	Rain-fall	Rain-fall col-lected	Per Cent col-lected
January	3.99	2.349	58.9	2.62	1.113	42.4	3.95	.832	21.0
February	3.84	2.434	63.3	2.52	1.515	60.1	2.57	1.649	64.3
March	3.14	4.751	151.5	3.84	2.584	67.4	5.89	6.159	104.5
April	7.30	5.070	69.4	2.06	1.709	83.0	3.12	3.349	107.5
May	3.65	3.199	87.6	3.07	.722	23.5	3.87	2.120	54.8
June	1.65	.394	23.9	1.62	.077	4.8	7.18	3.405	47.4
July	0.90	—.198	—21.9	4.08	—.041	— 1.0	1.66	.557	33.5
August	2.14	—.105	— 4.9	2.49	—.147	— 5.9	4.93	.229	4.6
September	2.11	—.043	— 2.1	0.81	—.313	—38.5	1.19	—.176	—14.8
October	2.85	.097	3.4	4.37	.052	1.2	2.23	—.048	— 2.1
November	2.97	.439	14.8	4.36	.860	19.7	0.95	.074	7.8
December	4.08	.630	15.5	2.56	.251	9.8	3.29	.532	16.1
Totals and averages	38.62	19.017	49.2	34.40	8.382	24.4	40.83	18.682	45.7

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area—Cont.

MONTH	1932			1933			1934			Mean for Sixty Years (1875–1934)		
	Rain-fall	Rain-fall col-lected	Per Cent col-lected	Rain-fall	Rain-fall col-lected	Per Cent col-lected	Rain-fall	Rain-fall col-lected	Per Cent col-lected	Rain-fall	Rain-fall col-lected	Per Cent Col-lected
January	4.69	1.835	39.1	2.36	1.854	78.5	3.85	3.031	78.7	3.92	1.987	50.7
February	2.59	1.384	53.4	4.09	1.539	37.6	4.36	.751	17.2	3.98	2.426	61.0
March	5.51	3.288	59.7	7.13	5.245	73.5	4.73	4.780	101.1	4.27	4.740	111.1
April	2.19	3.126	142.9	5.65	6.331	112.1	3.59	4.720	131.3	3.65	3.454	94.5
May	1.55	.819	52.8	2.49	1.300	52.1	3.70	2.283	61.7	3.22	1.940	60.2
June	3.28	.162	5.0	1.47	.205	13.9	4.53	.791	17.5	3.30	.887	26.9
July	1.92	—.175	— 9.1	2.13	—.206	— 9.7	2.91	—.061	— 2.1	3.59	.346	9.7
August	5.21	.056	1.1	3.53	—.137	— 3.9	2.10	—.058	— 2.8	3.82	.374	9.8
September	10.57	2.185	20.7	10.25	2.118	20.7	8.56	1.411	16.5	3.60	.470	13.1
October	6.59	3.067	46.6	2.98	.954	32.0	3.26	1.340	41.0	3.62	.720	19.9
November	5.10	5.030	98.6	1.11	.693	62.4	2.68	1.045	38.9	3.76	1.346	35.8
December	1.92	1.692	87.7	4.05	1.084	26.8	3.02	1.471	48.7	3.73	1.690	45.3
Totals and averages	51.12	22.469	43.9	47.24	20.980	44.4	47.29	21.504	45.5	44.46	20.381	45.8

The following table gives the record of the yield of the Sudbury River in gallons per day per square mile for each of the past six years and the mean for the past sixty years:

Yield of the Sudbury River Drainage Area in Gallons per Day per Square Mile[1]

MONTH	1929	1930	1931	1932	1933	1934	Mean for Sixty Years, 1875-1934
January	1,317,000	624,000	466,000	1,029,000	1,040,000	1,699,000	1,114,000
February	1,511,000	940,000	1,024,000	830,000	955,000	466,000	1,493,000
March	2,664,000	1,449,000	3,453,000	1.843,000	2,941,000	2,680,000	2,657,000
April	2,941,000	991,000	1,943,000	1,814,000	3,673,000	2,738,000	2,001,000
May	1,793,000	405,000	1,188,000	459,000	729,000	1,280,000	1,088,000
June	228,000	45,000	1,972,000	94,000	119,000	458,000	514,000
July	—111,000	—23,000	312,000	—98,000	—115,000	—34,000	194,000
August	—59,000	—83,000	129,000	31,000	— 77,000	—33,000	210,000
September	—25,000	—181,000	—102,000	1,264,000	1,225,000	816,000	272,000
October	54.000	29,000	—27,000	1,719,000	535,000	751,000	404,000
November	254,000	498,000	43,000	2,914,000	401,000	605,000	780,000
December	353,000	141,000	298,000	949,000	608,000	825,000	947,000
Average for whole year	905,000	399,000	889,000	1,067,000	999,000	1,024,000	970,000
Average for driest six months	55,000	33,000	110,000	578,000	344,000	424,000	393,500

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[1] The drainage area of the Sudbury River used in making up these records included water surfaces amounting to about 2 per cent of the whole area from 1875 to 1878, inclusive, subsequently increasing by the construction of storage reservoirs to about 3 per cent in 1879, to 3.5 per cent in 1885, to 4 per cent in 1894, and to 6.5 per cent in 1898. The drainage area also contains extensive areas of swampy land, which, though covered with water at times, are not included in the above percentages of water surfaces.

Nashua River

The average yield of the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton during the year 1934 was 1,315,000 gallons per day per square mile of drainage area, or 20.8 per cent above the average for the past 38 years. The average rainfall on this watershed for the past three years was 50.37 inches or 11.3 per cent more than the normal.

The average yield for the six driest months, June to November, inclusive, was 687,100 gallons per day per square mile of drainage area, or 20.8 per cent greater than the normal for this period.

There were large deficiencies in the yield during the months of February, July and August. The yield was in excess of the normal in the months of January, March, April, May, June, September, October, November and December.

The following table shows the normal yield of the South Branch of the Nashua River by months for the past 38 years, the actual yield in the year 1934 and the excess or deficiency in each month. The drainage area of the Nashua River above the point of measurement was 119 square miles from 1897 to 1907 and 118.19 square miles from 1908 to 1913, inclusive. Since January 1, 1914, the city of Worcester has been diverting water from 9.35 square miles of this drainage area for the supply of that city. The net drainage area tributary to Wachusett Reservoir is now 108.84 square miles.

Table showing the Average Daily Yield of the South Branch of the Nashua River for Each Month in the Year 1934, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1934		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.807	1.168	2.340	1.513	+ .533	+ .345
February	1.967	1.272	1.263	.816	— .704	— .456
March	3.912	2.528	4.382	2.832	+ .470	+ .304
April	3.550	2.295	5.485	3.545	+1.935	+1.250
May	2.000	1.293	2.615	1.690	+ .615	+ .397
June	1.267	.819	1.474	.953	+ .207	+ .134
July	.704	.455	.500	.323	— .204	— .132
August	.633	.409	.213	.137	— .420	— .272
September	.659	.426	1.444	.953	+ .785	+ .507
October	.771	.498	1.214	.785	+ .443	+ .287
November	1.264	.817	1.575	1.018	+ .311	+ .201
December	1.716	1.109	1.892	1.223	+ .176	+ .114
Average for whole year	1.685	1.089	2.034	1.315	+ .349	+ .226

The rainfall on the Nashua River watershed and the total yield expressed in inches in depth upon the watershed (inches of rainfall collected) for each of the past six years, 1929 to 1934, inclusive, together with the average for the past 38 years, are given in the following table:

Rainfall, in Inches, received and collected on the Nashua River Drainage Area

MONTH	1929			1930			1931		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	4.80	2.140	44.5	2.11	1.156	54.8	3.44	.881	25.6
February	4.28	2.310	54.0	2.20	1.396	63.5	2.71	1.103	40.7
March	3.40	4.912	144.5	3.65	2.146	58.7	5.00	4.545	90.9
April	5.83	4.953	84.9	1.88	1.646	87.8	2.98	4.001	134.2
May	4.62	3.851	83.3	2.77	1.039	37.5	5.01	2.258	45.1
June	3.09	1.020	33.0	2.96	.773	26.1	6.07	3.089	51.0
July	.85	.265	31.2	5.72	.808	14.1	2.71	.694	25.6
August	1.50	.125	8.4	1.69	.399	23.5	6.95	1.083	15.6
September	2.00	.272	13.6	1.91	.406	21.3	2.04	.517	25.3
October	3.12	.427	13.7	3.55	.655	18.4	2.46	.487	19.8
November	3.14	.630	20.1	3.92	.810	20.7	1.35	.546	40.5
December	3.30	.739	22.4	2.61	.661	25.4	3.63	1.209	33.3
Totals and averages	39.93	21.644	54.2	34.97	11.895	34.0	44.35	20.413	46.0

Rainfall, in Inches, received and collected on the Nashua River Drainage Area—Cont.

MONTH	1932			1933			1934			Mean for Thirty-eight Years 1897-1934		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per cent Collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	5.71	3.024	53.0	2.71	2.323	85.8	3.87	2.698	69.7	3.65	2.083	57.0
February	3.14	1.906	60.7	4.78	2.457	51.4	4.11	1.315	32.0	3.81	2.064	54.2
March	5.25	3.218	61.3	5.92	4.677	79.0	4.26	5.053	118.7	4.03	4.510	112.0
April	2.10	4.234	201.1	6 39	8.336	130.5	4.41	6.111	138.6	3.88	3.961	102.0
May	1.58	1.260	79.7	2.58	1.942	75.2	4.21	3.015	71.6	3.31	2.306	69.6
June	2.27	.585	25.8	1.93	.742	38.5	5.10	1.644	32.3	3.81	1.413	37.1
July	3.55	.383	10.8	2.16	.401	18.6	2.35	.577	24.6	3.96	.812	20.5
August	4.23	.503	11.9	4.68	.564	12.0	2.40	.245	10.2	4.03	.729	18.1
September	7.31	.880	12.0	10.88	3.020	27.8	9.64	1.614	16.7	3.94	.736	18.6
October	7.38	2.708	36.7	3.40	1.463	43.1	2.94	1.400	47.6	3.31	.889	26.8
November	5.21	3.992	76.7	1.68	1.034	61.6	2.76	1.757	63.7	3.64	1.410	38.8
December	2.20	1.916	87.2	3.86	1.388	35.9	4.16	2.181	52.4	3.90	1.978	50.8
Totals and averages	49.93	24.609	49.3	50.97	28.347	55.6	50.21	27.610	55.0	45.27	22.891	50.6

The following table gives the record of the yield of the Nashua River watershed in gallons per day per square mile for each of the past six years and the mean for the past 38 years.

Yield of the Nashua River Drainage Area in Gallons per Day per Square Mile[1]

MONTH	1929	1930	1931	1932	1933	1934	Mean for Thirty-eight Years, 1897-1934
January	1,200,000	648,000	494,000	1,695,000	1,302,000	1,513,000	1,168,000
February	1,434,000	867,000	685,000	1,143,000	1,525,000	816,000	1,272,000
March	2,754,000	1,203,000	2,548,000	1,804,000	2,622,000	2,832,000	2,528,000
April	2,873,000	955,000	2,321,000	2,456,000	4,836,000	3,545,000	2,295,000
May	2,159,000	583,000	1,266,000	706,000	1,089,000	1,690,000	1,293,000
June	591,000	448,000	1,789,000	339,000	430,000	953,000	819,000
July	148,000	453,000	389,000	215,000	225,000	323,000	455,000
August	70,000	224,000	607,000	282,000	316,000	137,000	409,000
September	157,000	235,000	299,000	509,000	1,747,000	933,000	426,000
October	239,000	367,000	273,000	1,518,000	820,000	785,000	498,000
November	365,000	469,000	316,000	2,313,000	599,000	1,018,000	817,000
December	414,000	371,000	678,000	1,074,000	778,000	1,223,000	1,109,000
Average for whole year	1,031,000	566,000	972,000	1,169,000	1,350,000	1,315,000	1,089,000
Average for driest six months	232,000	353,000	428,000	597,000	682,300	687,100	568,800

[1] The drainage area used in making up these records included water surfaces amounting to 2.2 per cent of the whole area from 1897 to 1902, inclusive, to 2.4 per cent in 1903, to 3.6 per cent in 1904, to 4.1 per cent in 1905, to 5.1 per cent in 1906, to 6 per cent in 1907, to 7 per cent in 1908, 1909 and 1910, to 6.5 per cent in 1911, to 6.8 per cent in 1912, to 7 per cent in 1913, to 7.4 per cent in 1914 and 1915, to 7.6 per cent in 1916, to 7.4 per cent in 1917 and 1918, to 7.5 per cent in 1919, 1920, 1921 and 1922, to 7.4 per cent in 1923 and 1924, to 6.4 per cent in 1925, to 5.9 per cent in 1926, to 5.7 per cent in 1927, to 7.6 per cent in 1928, to 7.4 per cent in 1929, to 5.6 per cent in 1930, to 6 per cent in 1931, to 7.3 per cent in 1932, and 7.6 per cent in 1933 and 7.6 per cent in 1934.

Merrimack River

The Merrimack River is the second largest stream in the State of Massachusetts. It rises in the White Mountains in the State of New Hampshire and flows southerly through the central part of that state until it enters Massachusetts, where it turns to the east and flows in a general northeasterly direction the remainder of its course to the sea. The total length of its watershed from its extreme northerly limits in the mountains of northern New Hampshire to its extreme southerly limits in the hills of Hopkinton, Massachusetts, is about 137 miles and its extreme width is about 66 miles. The total drainage area above the mouth of the river at Newburyport comprises about 5,000 square miles, of which about one-quarter or 1,250 square miles are within the limits of Massachusetts and three-quarters or 3,750 square miles are within the State of New Hampshire.

Records of the flow of the Merrimack River have been kept continuously at Lawrence in the office of the Essex Company since 1880. The original drainage area of the river at that point was 4,663 square miles and included 118.19 square miles tributary to the South Branch of the Nashua River used for the water supply of the Metropolitan Water District and in part for the city of Worcester, 75.2 square miles on the Sudbury River, and 18 square miles tributary to Lake Cochituate. The flow as measured at Lawrence includes the water wasted from these drainage areas. In presenting the record of the flow of the river these drainage areas have been deducted, leaving the net drainage area above Lawrence 4,567 square miles in 1880, 4,570 square miles in 1891 to 1897, inclusive, and 4,452 square miles since the latter date. The quantity of water overflowing from the Cochituate and Sudbury watersheds as measured by the Metropolitan District Commission also has been deducted from the flow of the river as measured at Lawrence. The average flow of the river during the year 1934 amounted to 1.718 cubic feet per second per square mile, which is about 18.2 per cent more than the normal for the past 55 years. The flow was more than the normal during the months of January, April, May, September, October, November and December and less than the normal during the months of February, March, June, July and August. The greatest deficiency occurred in the month of June.

The following table shows the relation between the normal flow of this stream during the past 55 years and the actual flow during each month of the year 1934:

Table Showing the Average Monthly Flow of the Merrimack River at Lawrence for the Year 1934; also the Normal and Departure therefrom in Cubic Feet per Second per Square Mile of Drainage Area.

MONTH	Normal Flow, 1880-1934	Actual Flow in 1934	Excess or Deficiency
January	1.260	1.468	+ .208
February	1.326	1.248	— .078
March	2.689	2.434	— .255
April	3.622	6.042	+2.420
May	2.222	2.325	+ .103
June	1.242	.957	— .285
July	.749	.479	— .270
August	.643	.450	— .193
September	.655	.939	+ .284
October	.803	1.210	+ .407
November	1.147	1.475	+ .328
December	1.086	1.591	+ .505
Average for whole year	1.454	1.718	+ .264

The following table gives the record of the flow of the Merrimack River at Lawrence for each of the past six years, together with the average flow in the past 55 years, this amount being expressed in cubic feet per second per square mile of drainage area.

Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile

MONTH	1929	1930	1931	1932	1933	1934	Mean for Fifty-five Years, 1880-1934
January	1.537	.861	.423	1.803	1.333	1.468	1.260
February	1.487	.949	.478	1.301	1.295	1.248	1.326
March	3.649	2.242	1.603	1.363	2.392	2.434	2.689
April	3.993	2.035	3.665	4.454	7.363	6.042	3.622
May	3.424	1.172	1.897	1.319	2.144	2.325	2.222
June	.973	1.055	2.207	493	.816	.957	1.242
July	.583	.521	.756	.499	.406	.479	.749
August	.400	.520	.520	.483	.509	.450	.643
September	.365	.378	.471	.673	.971	.939	.655
October	.408	.311	.471	1.223	1.367	1.210	.803
November	.499	.562	.621	2.431	1.157	1.475	1.147
December	.488	.518	.973	1.157	1.187	1.591	1.086
Average for whole year	1.484	.927	1.174	1.433	1.745	1.718	1.454
Average for driest six months	.457	.468	.635	.782	.871	.918	.847

Weekly Flow of the Sudbury, Nashua and Merrimack Rivers

The following table shows the weekly fluctuations during the year 1934 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 118.19 square miles, and of the Merrimack River at Lawrence 4,452 square miles.

Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1934, in Cubic Feet per Second per Square Mile of Drainage Area

WEEK ENDING SUNDAY —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	WEEK ENDING SUNDAY —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 7 . . .	1.641	2.143	1.363	July 1 . . .	.391	.757	.830
14 . . .	4.738	3.168	1.516	8 . . .	— .025	.531	.484
21 . . .	2.192	1.555	1.382	15 . . .	— .264	.258	.424
28 . . .	2.412	2.714	1.515	22 . . .	— .324	.200	.364
Feb. 4 . . .	1.281	1.643	1.446	29 . . .	.246	1.014	.407
11 . . .	.774	1.131	1.263	Aug. 5 . . .	.060	.374	.824
18 . . .	.379	.973	1.170	12 . . .	— .328	.173	.556
25 . . .	1.374	1.503	1.241	19 . . .	— .148	.406	.335
Mar. 4 . . .	1.314	2.029	1.200	26 . . .	.152	.188	.331
11 . . .	7.394	6.053	2.941	Sept. 2 . . .	— .049	— .068*	.356
18 . . .	2.517	2.825	2.166	9 . . .	.906	1.278	.300
25 . . .	3.161	3.276	2.519	16 . . .	.540	.514	.869
Apr. 1 . . .	5.012	7.238	3.276	23 . . .	1.935	2.832	1.765
8 . . .	6.931	5.026	6.971	30 . . .	1.708	1.617	1.041
15 . . .	5.807	8.847	6.772	Oct. 7 . . .	1.812	1.590	1.317
22 . . .	4.703	5.262	6.820	14 . . .	1.120	.930	1.278
29 . . .	2.359	2.621	4.173	21 . . .	.951	.870	1.140
May 6 . . .	3.788	4.608	3.214	28 . . .	1.078	1.491	1.100
13 . . .	2.316	2.916	3.047	Nov. 4 . . .	.855	1.852	1.159
20 . . .	1.948	2.117	2.076	11 . . .	1.173	1.804	1.826
27 . . .	.650	1.584	1.648	18 . . .	.923	1.308	1.458
June 3 . . .	.618	1.156	1.106	25 . . .	.667	1.182	1.393
10 . . .	.275	1.003	.887	Dec. 2 . . .	1.569	2.234	1.598
17 . . .	.833	1.401	.861	9 . . .	1.681	1.952	2.460
24 . . .	1.405	2.679	1.248	16 . . .	.466	.955	1.177
				23 . . .	1.424	2.458	1.296
				30 . . .	1.306	1.682	1.303

*There was no draft Aug. 21 to Oct 1
Note: For drainage areas used see previous pages

EXAMINATION OF RIVERS

During the six months, June to November, inclusive, the principal streams of the State were examined by the engineers, and samples of water were collected for chemical analysis and dissolved oxygen determination, while in some instances bacterial examination was made of the samples. In many instances the sanitary condition of these streams shows an improvement over that found in more recent years. The reason for this improvement is probably due to the even distribution of a nearly normal rainfall and a continued decrease in industrial activities.

Aberjona River

The effect of seepage through deposits of various partially-spent chemicals at the abandoned chemical plant in North Woburn has been increasingly noticeable in the upper portion of the Aberjona River during the past year, but in the lower portion of its course this river was in a comparatively good condition. The Aberjona River sewer was practically completed at the end of the year, and presumably the offensive tannery wastes now discharged into the upper reaches of this stream will be removed early during the coming year. A new industry is being established at the abandoned chemical plant in North Woburn from which the wastes will be discharged into the sewer now nearing completion.

Assabet River

The analyses have shown an improvement in the Assabet River below Westborough, and there has been a slight improvement throughout parts of the lower portion of its course. Much untreated sewage has been allowed to overflow into the river at Hudson due to the reconstruction of the filter beds and difficulties with the pumps. The river has been unsightly during the last year due to sewage and oily discharges from Hudson and to industrial wastes from Maynard. Some improvement has been made in the sewage disposal works at Hudson during the year, and the improvements at the sewage disposal works at Westborough and at the Massachusetts Reformatory at Concord should assist in improving the condition of this river.

Blackstone River

The examinations indicate a slight increase in the pollution of the Blackstone River below Worcester due apparently to renewed activities in certain industrial establishments, and the river has been badly discolored by industrial wastes containing iron and oil. The effluent from the Worcester sewage treatment works, however, has tended to decrease the concentration of iron in the river.

Kettle Brook in the upper portion of the watershed is still highly discolored by industrial wastes. While there has been a very slight increase in organic pollution in the lower portion of this stream, the conditions are not materially different from those found in recent years.

The Rutland-Holden-Worcester sewer, by means of which sewage from certain institutions in Rutland is now conveyed to the Worcester sewage treatment works, was put into use late in the year, and there is no reason to believe that the addition of this comparatively small quantity of sewage will have any detrimental effect on the character of the Blackstone River.

Charles River

The Charles River below Milford has been turbid during much of the year and has shown evidence of improper purification of the sewage from the town of Milford. The analyses have shown the objectionable effect of certain industrial wastes discharged into the stream at Medway, and the stream lower down in its course has shown evidence of more pollution than in recent years. There also has been evidence of an increase in organic matter in the water of the Charles River Basin and an increase in the number of micro-organisms.

There have been several conferences during the year relative to the improvement of the Milford sewage treatment works in order to protect from pollution this stream which can be considered in part a water supply stream. The conferences have been held with State and Federal authorities particularly with regard to Federal assistance in the construction of the much needed additions to the Milford sewage treatment works, and there is reason to believe that suitable action will be taken by the authorities early next year looking to the removal of this serious source of pollution of the Charles River.

Chicopee River

The analyses have shown a slight change for the better in the condition of the Quaboag River. This is also true of the Ware River, both below Barre and below Ware. This improvement probably was due to a reduction in industrial activities in this valley. There has been evidence of a slight increase in pollution in the lower portion of the Chicopee River. During the past year plans have been approved for certain changes in the Palmer sewerage system, and a modern sewage disposal works has been constructed at the Monson State Hospital. In addition, near the end of the year the Department approved the purchase or taking of certain additional areas of land for sewage disposal purposes at Spencer, and a much needed addition to the sewage disposal works of this town is now under construction.

Concord and Sudbury Rivers

The analyses of the water of Bannister Brook, which receives the effluent from the Natick and Framingham sewage disposal works, made during 1934 have shown the presence of greater quantities of albuminoid ammonia than last year, and the examinations have shown visible pollution from the sewage treatment works of these two municipalities. There has been practically no evidence of an increase in the pollution of the Sudbury River below Saxonville or of the Concord River down to its mouth in the Merrimack River at Lowell, though the amount of dissolved oxygen in both the Sudbury and Concord rivers shows a tendency to decrease. During the past year the town of Framingham started an investigation relative to additional sewage disposal works, and a contract was made for the construction of a new sewage treatment plant for the town of Natick. In addition, the management of the carpet mills at Saxonville has retained engineers who are studying the question of treating the industrial wastes at that point, and the domestic sewage formerly discharged into the river from this mill has been largely diverted to the Framingham sewerage system.

Connecticut River

No special examination has been made of the Connecticut River and its tributaries, though samples of the water have been collected at various points as usual for analysis. The Mill River below Northampton showed somewhat less evidence of pollution than in the past few years, while above Holyoke there was some evidence of an increase in pollution. The Connecticut River below Springfield showed somewhat less evidence of pollution than last year. There has been much interest in the Connecticut River Valley during the year looking to the removal of pollution of this stream and its tributaries, and several conferences have been held in that vicinity. The Department was represented at one of the larger meetings in Springfield. Any activity looking toward the cleaning up of this stream should be in accordance with a comprehensive engineering study of the whole matter.

French River

There is some evidence of additional pollution above Webster and Dudley, but the condition of the river below these municipalities does not appear to have changed during the past year. The sewage of Webster and Dudley is still discharged into this stream without treatment although such works are greatly needed.

Hoosick River

Immediately below the town of Adams there appears to have been no particular change in the condition of the water of the Hoosick River, but at the point where this stream reaches the thickly settled part of North Adams the analyses have shown a decrease in the amount of dissolved oxygen due evidently to the pollution from the town of Adams. A slight improvement in the character of the stream has been noted in Williamstown. Plans have been considered by the Department during the past year for the construction of sewage treatment works at Adams, but no action toward the construction of these plants had been taken at the end of the year. The city of North Adams, however, with the assistance of Federal funds has been engaged throughout the year in the construction of intercepting sewers by means of which the sewage of practically the whole city will be conveyed to a point below North Adams where it is to be treated for the removal of suspended matter in works approved by the Department. The town of Williamstown was engaged during the year in improving and extending its sewerage system, and permission was given for the discharge of Williamstown sewage directly into the river without treatment for a limited time.

Housatonic River

The analyses have shown an improvement in the condition of the west branch of the Housatonic River in Pittsfield, while below the city the analyses of the main stream also have shown a slight improvement, though there has been a decrease in the amount of dissolved oxygen at several points on the stream below the city. The city of Pittsfield has given some consideration to the construction of additional sewage disposal works, and certain drainage work has been carried on during the year at these works, though no increase in the capacity of the works has been provided. Much sewage is allowed to overflow from the sewers and sewage treatment works of this city, and it is impracticable to make any marked improvement in the character of this stream until adequate sewage treatment works are provided.

Merrimack River

Samples collected above Nashua, New Hampshire, have shown an improvement in the condition of the river, and this improvement has been noticeable down stream to Lawrence. There has been a slight increase in pollution just below Lawrence as compared to the last few years, while below Haverhill the stream was noticeably polluted. As in past years the river has been examined in accordance with the provisions of Chapter 202 of the Acts of 1929. No substantial change in the character of the river has been noted other than as stated above. Some interest was shown toward the end of the year in the Merrimack Valley sewerage question, particularly with a view to obtaining Federal assistance in financing the necessary works.

On February 14, 1934, the Department in response to a request and in accordance with law, determined the sources of pollution of the shellfish areas at Newburyport and the proportions in which the various municipalities were responsible. The list reported to the Commissioner of Conservation of the municipalities and the proportion each contributes to the pollution of the shellfish areas are as follows:

Cities and Towns	Per Cent of Total Pollution Contributed
Chelmsford	0.1
Lowell	7.8
Dracut	0.2
Lawrence	8.5
Methuen	2.1
Andover	1.8
North Andover	0.9
Haverhill	10.5
Amesbury	5.2
Salisbury	14.1
Newburyport	48.8

Millers River

The analyses have shown evidence of pollution of the Millers River below Gardner, but there has been no material change in the character of this stream at other points during the year.

Nashua River

The examinations and the analyses have shown an increase in pollution by industrial wastes from Fitchburg, and these wastes, together with sewage from Leominster, have been noticeable in the North Branch of the river down to its mouth. The South Branch below the Clinton sewage filters has shown an increase in pollution, and at Groton the main stream is not in a satisfactory condition for recreational uses largely because of the pollution of the North Branch. Satisfactory progress has been made during the year in the construction of the sewage treatment works for the city of Leominster under plans approved by the Department. This is a very satisfactory E.R.A. project. With the removal of Leominster sewage from the river it is increasingly desirable that action be taken by suitable legislation or otherwise to remove the foul industrial wastes from the seriously polluted North Branch of the river.

Neponset River

The Neponset River below Walpole has had an oily scum and considerable color at times, and the analyses have shown a slight increase in pollution below East Walpole. There also has been a slight increase in pollution in Mother Brook at its mouth. Otherwise the improvement of the last two years effected by the new sewerage systems in this valley has been maintained. The sewage from the Massachusetts Hospital School in this valley was removed during the year to the Canton sewerage system in a sewer constructed by the town under a P.W.A. project.

North River (Salem and Peabody)

Chapter 49 of the Resolves of 1934 directed this Department and the Department of Public Works to investigate the sewage problem in the South Essex Sewerage District and in connection with the report on this matter, which appears as House Document 1250 of 1935, the question of the pollution of the North River is discussed extensively. The results of the analyses of samples from the North River below Peabody and at its mouth in Salem show it to be the most seriously polluted stream in the State, and suitable legislation looking to the removal of the pollution of this stream should be adopted in 1935.

Quinebaug River

When examined during the past year the Quinebaug River has been badly discolored with industrial wastes and poorly purified sewage effluent. Some improvement has been effected during the year at the Southbridge sewage disposal works with Federal assistance, but until more adequate works are provided this stream will continue to be polluted by sewage from the town of Southbridge.

Taunton River

There has been a slight improvement in the Salisbury Plain River below Brockton, but the analyses of the Coweeset River below the Brockton sewage treatment plant have shown more pollution than in the previous two years, and a slight increase in pollution has been noted down stream, particularly below Taunton. After many conferences and much discussion the ammonia still liquors from the Brockton gas works were discharged into the Brockton sewers in April, 1934. The effect of this waste, amounting to only about 3,000 gallons per day, was to raise the free ammonia in the Brockton sewage effluent considerably and there has been more free ammonia in the river below this effluent than for several years. There still appears to be no reason to object to the disposal of this waste into the Brockton sewers provided it is discharged in even quantities as recommended by the Department. Further experiments by the Department this year show that this small quantity of waste when mixed with domestic sewage can be properly purified. Much progress was made during the year under a P.W.A. project in providing a sewer for the removal of sewage from Mill River in Taunton and consideration has again been given during the year to providing treatment works for the Taunton sewage in order to relieve the present objectionable conditions. Consideration was given in the latter part of the year to the construction of an intercepting sewer and sewage treatment works in Fall River in order to relieve objectionable conditions near the various sewer outlets in the Taunton River and Mt. Hope Bay. Fall River is the largest seaport city in the State without some reasonably suitable means of sewage disposal, and the many nuisances along this waterfront should be corrected.

Ten Mile River

The Ten Mile River has shown a slight increase in pollution below North Attleborough and Attleboro, but it is to be expected that the improvements made at the sewage disposal works of both these municipalities will shortly result in a cleaner stream.

Examinations of the other larger streams in the State have shown no material change in condition during the year.

Municipal Sewage Treatment Works

In the exercise of its duties in the oversight of inland waters the Department has examined all of the sewage treatment works in the State during the past year, and samples of raw sewage, settled sewage, and the effluent have been collected and analyzed at frequent intervals. In certain instances it has been necessary for the Department to notify the local officials of objectionable conditions and a number of improvements have been carried out, chiefly as a result of funds being made available through the Federal Government.

Attleboro

In the city of Attleboro the program of partial reconstruction of the sewage treatment works, which was commenced during the year 1933, was practically completed. This work consisted of removing the clogged material from the surfaces of the filter beds to a depth of 6 to 8 inches and replacing it with clean sand and gravel of suitable size. So far as can be ascertained by the results of the chemical analyses, the raw sewage treated at these works during the past year was stronger than that received during the year 1933, while a larger amount of putrescible organic matter represented by albuminoid ammonia was removed in the passage of the sewage through the filters. A more satisfactory purification of the sewage at this plant could be effected by more even distribution of the sewage over the entire plant, and it is important, as recommended by the Department on November 16, 1933, that plans be prepared for preliminary treatment of the sewage and for increasing the area of the sewage beds to at least 20 acres.

Brockton

As in the case of previous years the sewage treatment works of the city of Brockton have been carefully controlled under the local laboratory maintained at the sewage treatment works. The results of the analyses show that the plant has been efficiently operated during the year.

Clinton

Considerable difficulty was encountered during the past year in the operation of the sewage treatment works at Clinton because of the large amount of distillery waste discharged into the sewerage system of that town. As a result of an investigation by this Department and with the assistance of the office of the Attorney-General, the discharge of waste into the sewerage system from one of the distilleries was discontinued during the fall under the following stipulation before the superior court:

"And now comes the respondent, Clinton Distilleries Corporation, and stipulates that its agents and servants will not discharge industrial wastes from the distilleries processes carried on at the Clinton Distilleries Corporation plant in Clinton until the suspended matters are reduced to not over five hundred parts per million, and until a method has been arranged or put in effect to so reduce the suspended matters, the present connection from the Clinton Distilleries Corporation plant to the Public Sewerage system shall be discontinued."

The analyses show a marked increase in the strength of the sewage of the town of Clinton and in general the sewage is poorly purified. The sewage effluent contains a considerable amount of organic matter and a large quantity of iron. The construction of more modern treatment works is very necessary for the disposal of the sewage of the town of Clinton if offensive conditions in the vicinity of the works and the stream into which the effluent is discharged are to be prevented.

Concord

During the year steps were taken by the authorities of the town of Concord for the construction of three new filter beds which when constructed will increase the area from 5.48 acres to 7.41 acres. Two of the beds had been practically completed by the end of the year and construction had been commenced on the third bed. With this additional area available, it will be possible to filter the sewage at a reasonably low rate. It is necessary that the sewage be distributed more evenly over the entire area than has been the case in the past.

Easthampton

At Easthampton large quantities of sewage were allowed to discharge into the Manhan River after sedimentation only. Less than half the entire quantity of the sewage of the town is filtered through the sand filter beds. At times the spring flows in the Manhan River cause the flooding of the entire area of filter beds.

Fitchburg

The sewage treatment works of the city of Fitchburg have as usual been operated under expert supervision and the sewage has been well purified. The construction of an additional sludge drying area which was begun in 1933 has progressed slowly during this year. General improvement of the grounds around the plant also has been carried on during the year.

Framingham

The sewage from the town of Framingham as discharged to the disposal works continues to show an increase in strength and the works have given unsatisfactory results during the year. The beds constructed in 1933 have been used to excess and show unsatisfactory results. In August of this year, at the request of the Town Engineer of Framingham, a special examination of the disposal plant was made over a period of 24 hours. Under a vote of the town an investigation has been in progress during the year looking to the construction of more modern works. The investigation is being made by the Town Engineer. Substantial, modern works for the treatment of Framingham sewage are necessary if a nuisance in this region is to be prevented.

Franklin

The sewage disposal works of the town of Franklin have received but limited attention during the year. The strength of the sewage received at the works has increased considerably, but the results of the analyses of samples of the final effluent showed a slight improvement in quality over those of last year. The reconstruction of two beds begun last year was completed, and the beds have been put in operation. These disposal works are operated at an excessive rate, and the area of the filter beds should be enlarged. The old Franklin disposal plant, located on the east side of the town, is not properly operated and is not adequate in area. This plant should be abandoned, and the sewage should be pumped to an enlarged area at the Mine Brook filter beds at Unionville.

Gardner

Both the Gardner area and the Templeton area have been operated about as usual during the past year. The results of the analyses of samples of the sewage at both plants show that it was somewhat weaker in 1934 and that there has been an improvement in the quality of the final effluent. These plants are at times badly crowded due to leakage and the discharge of surface drainage into the sanitary sewerage system. A suitable measuring device should be installed at the Templeton plant as previously recommended.

Hopedale

The sewage disposal works for Hopedale are of adequate capacity and are efficiently operated. The results of the analyses of samples of the sewage show an increase in strength, and there was a slight falling off in the quality of the final effluent.

Hudson

Following a special examination of the sewage filter beds at Hudson late in 1933, work was started on reconstructing the filter beds by relaying the underdrains at a slightly higher elevation and loosening the surfaces of the filters. The plant has been out of commission part of the year due to construction activities and difficulties with the pumps, and the raw sewage was discharged to the Assabet River. Since the work has been completed an improvement in the effluent has been noted.

Leicester

The sewage disposal works at Leicester have received more attention during the past year than usual, and with a slight increase in strength of the sewage the efficiency of the plant has been slightly better than in previous years according to the samples collected by the local attendant.

Leominster

Considerable progress has been made on the construction of new sewage treatment works at Leominster approved during the year by the Department. These works, consisting of screens, a grit chamber, sedimentation tanks, aeration tanks and final sedimentation tanks with covered sludge digestion tanks and sludge beds, are being constructed under an E.R.A. project, and the materials thus far used have been obtained locally at very low cost. This is one of the most satisfactory E.R.A. projects to which the attention of the Department has been called, and with the progress made during the year the works can undoubtedly be completed so that the court decree, which orders the removal of the sewage from the North Branch of the Nashua river before February 1, 1938, can readily be complied with. In connection with the work now under way the old filter beds are being made into sludge beds for the new works. It has been necessary to abandon the use of the old plant during most of the year so that practically all of the sewage has overflowed into the river without treatment.

Marion

The new sewage treatment plant at Marion which was constructed in 1930 has been continued in satisfactory operation during the year. More attention has been given to the operation of the plant, and the results of the analyses of samples of the sewage and effluent show a reasonable degree of purification, although the plant is operated at a high rate. Additional filter beds should be constructed at this plant at an early date.

Marlborough

The reconstruction of the sewage filter beds at Marlborough, begun in 1933, was completed during the year. The results of the analyses of samples of the final effluent show that the efficiency of the sewage disposal works has been satisfactory.

Maynard

The disposal works for Maynard are operated without expert supervision and at a low rate for an Imhoff tank-trickling filter plant, but the results of the analyses of samples of the final effluent show that the sewage has been reasonably well purified and with increased efficiency, although the treated sewage has been stronger than at any time since the plant was put into operation late in the year 1929.

Milford

The sewage disposal works of the town of Milford, consisting of sedimentation tanks, sand filter beds, an Imhoff tank, a trickling filter and secondary tank, continue to be operated without technical supervision, and largely because the works are inadequate the results are most unsatisfactory. Toward the end of the year 1933 an application was made for Civil Works Administration funds without results, but during this year plans were submitted to this Department for the construction of a second unit, consisting of an Imhoff tank, trickling filter, secondary tank and sludge drying beds and the plans were approved. Several conferences have been held with the Milford, State financial and Federal authorities. Toward the end of the year the town was negotiating with the Federal Emergency Relief Administration for funds to start the preliminary work in connection with the construction of the necessary additions. The matter of the appropriation of funds will presumably be considered at the next regular town meeting.

Nantucket

The operation of the filter beds at Nantucket is interfered with more or less by sand blown onto the beds from the surrounding country. More attention should be given this plant, and the sewage should be more evenly distributed.

Natick

The old sewage disposal works were still in use at the end of the year. Plans for a new sewage treatment works were submitted and recommended for adoption by this Department in August 1933, and the necessary legislation was obtained during the year. Toward the end of the past year ground was broken for the construction of the new sewage treatment works at a more isolated point. This work is being done as a P.W.A. project. The old plant is to be abandoned.

North Attleborough

The sewage disposal works at North Attleborough were enlarged in 1930, and the town has completely reconstructed one bed during each of the past four years. Further enlargements are necessary.

Northbridge

While these disposal works are still being operated at a high rate, the analyses of the final effluent show that the efficiency of the plant is being fairly well maintained, although the strength of the raw sewage has increased during the year. The excellent condition is due to the efficient handling of the works. It is recommended that a measuring device be installed at these works at an early date in order that more definite information may be available as to the quantity of sewage treated.

Pittsfield

The sewage disposal works at Pittsfield continue to show very unsatisfactory results even though several beds were reconstructed by removing surface material and replacing it with clean material in 1933. The Department has approved general plans for the proper treatment of the sewage of this city and has recommended, particularly in a communication dated July 28, 1933, the advisability of attempting to secure Federal funds for the improvement of the sewage treatment works. The city has not obtained the necessary funds, but during the latter part of the year a drain was laid along the southerly side of the filter beds to lower the ground water and provide an outlet for the effluent to be discharged from the new treatment works when constructed. The new works should be constructed at the earliest practicable time.

Southbridge

The sewage disposal works of Southbridge continue to be inadequate for the proper treatment of the sewage of that town. The plant is not efficiently operated and large quantities of sewage overflow into the Quinebaug River. In 1933 the Department recommended the enlargement of these works or the construction of more modern treatment works. During the year the town has been engaged under town and Federal funds in the reconstruction of five old beds under the direction of the town engineer. With the completion of the reconstruction of the old beds, somewhat better purification should be obtained, but the disposal works will still be inadequate to efficiently dispose of the sewage of the town and more adequate treatment works should be constructed at an early date.

Spencer

The sewage disposal works of the town of Spencer continue to be inadequate for the proper disposal of the sewage, and the works are not efficiently operated. Much sewage is allowed to overflow into Seven Mile River especially at times of storm. During the middle of the year the E.R.A. administrator for the town of Spencer applied to the Department for advice relative to building additional disposal works. Subsequently plans were presented and approved for the purchase of 60 acres of land east of the present sewage filter beds to be used in part for the construction of new sewage filter beds. At the end of the year stripping and excavation for the new sewage filter beds had been started.

Stockbridge

The inefficient operation of the disposal works of the town of Stockbridge was continued during the past year. The enlargement and reconstruction of these works should be undertaken at an early date under proper engineering supervision. The results of the analyses of samples of the final effluent have shown a steady falling off in efficiency of these works.

Westborough

The disposal works at Westborough have been reasonably well operated during the past year and have maintained a fairly high standard of purification of the sewage.

Winchendon

At Winchendon the disposal works are apparently well operated, but the results of the analyses of samples of the effluent from the filter beds show a falling off in efficiency. As no information about the quantity of sewage discharged to this plant is available, the Department in 1933 recommended the installation of a measuring device to determine the flow of sewage as discharged to the filter beds. This installation is necessary if the plant is to be properly operated.

Worcester

The sewage treatment works of the city of Worcester are operated under expert supervision, and the results of the analyses of samples of the final effluent as discharged to the Blackstone River show that the sewage is reasonably well purified. The authorities of the city late in 1933 submitted plans to the Department providing for two secondary sludge concentration tanks, certain gates on the trickling filter effluent lines and other improvements. The work was to be done under P.W.A. grants. The plans were approved by the Department, but partly because of unsatisfactory prices for materials very little of this work was done during 1934.

The results of the Department's analyses and records of operation of the larger municipal sewage treatment works are given in the appended tables. It will be noted that due to the dry season during a part of the year the strength of sewage of many of the municipalities has increased over previous years.

TABLE No. 1.—*Average Results of the Analyses of Monthly Samples of Sewage as received at Disposal Works. (Fats determined in about 64 per cent of the Samples)*

[Parts per Million]

CITY OR TOWN	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	OXYGEN CONSUMED		IRON		Kjeldahl Nitrogen	Fats
	TOTAL RESIDUE			LOSS ON IGNITION			Free	ALBUMINOID									
	Total	Dissolved	Suspended	Total	Dissolved	Suspended		Total	Dissolved	Suspended		Total	Dissolved	Total	Dissolved		
ATTLEBORO[2]	434	277	157	237	103	134	50.2	6.89	3.51	3.38	37	50.3	28.6	1.83	.65	15.4	–
BROCKTON	670	488	182	361	202	159	62.0	10.17	6.72	3.45	92	111.5	70.5	1.48	.54	19.8	69
Clinton[2]	1085	440	645	801	250	551	29.2	17.29	8.55	8.74	40	172.5	105.7	2.56	.63	35.5	148
Concord	241	177	64	119	63	56	18.7	3.18	1.97	1.21	21	28.9	22.2	.63	.29	6.6	–
Easthampton	428	291	137	233	116	117	40.8	6.73	4.37	2.36	40	50.5	34.2	.72	.28	12.8	–
FITCHBURG	326	247	79	164	103	61	23.4	3.54	2.14	1.40	33	37.7	28.3	2.55	1.00	8.3	32
Framingham[1]	613	400	213	346	176	170	41.0	9.65	7.17	2.48	42	71.7	43.4	1.99	.78	18.8	75
Framingham[2]	1046	522	524	636	221	415	37.0	10.26	6.98	3.28	52	100.3	58.4	3.14	.83	22.6	142
Franklin	872	715	157	259	130	129	27.1	5.21	2.99	2.22	276	57.9	36.7	1.49	.51	12.2	–
GARDNER (Gardner Area)	678	399	279	424	196	228	43.8	9.50	6.08	3.42	40	92.3	65.5	1.63	.66	23.5	85
GARDNER (Templeton Area)	600	388	212	359	166	193	52.3	9.78	6.39	3.39	53	85.8	53.1	1.46	.56	19.6	80
Hopedale	1022	485	537	706	252	454	42.4	12.03	7.95	4.08	48	123.7	82.0	5.77	.66	25.3	–
Hudson	637	395	242	387	177	210	68.3	11.97	7.87	4.10	52	89.7	55.3	1.87	.54	25.0	97
Leicester	354	260	94	186	105	81	34.6	6.20	4.26	1.94	27	37.6	26.4	.61	.21	15.5	–
Marion	406	234	172	260	104	156	27.1	3.56	2.40	1.16	36	37.3	22.2	1.43	.65	8.1	–
MARLBOROUGH	578	390	188	340	189	151	37.5	8.33	5.63	2.70	46	61.8	37.5	1.42	.48	16.9	71
Maynard	707	391	316	457	178	279	85.2	22.52	13.23	9.29	57	81.1	52.5	2.41	.59	39.7	–
Milford	392	282	110	196	107	89	33.2	5.23	3.05	2.18	39	40.7	26.3	1.03	.41	10.6	–
Natick[2]	584	347	237	328	136	192	45.3	8.74	4.55	4.19	48	67.0	37.5	1.43	.54	17.0	83
North Attleborough	321	225	96	162	84	78	18.7	4.34	2.62	1.72	23	34.5	19.6	.90	.40	9.0	–
Northbridge	450	267	183	280	120	160	49.1	10.10	6.08	4.02	37	60.1	35.6	1.25	.36	21.1	–
PITTSFIELD[2]	405	304	101	210	126	84	42.4	5.48	3.62	1.86	29	37.7	25.2	1.74	.34	12.0	27
Southbridge	545	303	242	331	121	210	43.6	7.77	4.18	3.59	44	74.8	45.1	1.58	.54	17.6	115
Spencer	380	283	97	228	144	84	21.2	6.65	4.24	2.41	27	57.2	39.2	1.17	.53	13.1	50
Stockbridge	287	232	55	141	94	47	22.3	2.84	2.24	.60	15	25.5	17.9	.47	.24	6.4	–
Westborough	596	297	299	373	140	233	40.6	8.74	5.49	3.25	34	68.7	38.7	1.61	.42	19.2	91
Winchendon	487	318	169	281	142	139	41.5	7.60	5.39	2.21	38	57.7	37.9	2.67	1.13	16.0	–
WORCESTER	833	509	324	323	112	211	22.3	5.30	1.65	3.65	78	85.8	28.9	41.97	8.28	15.2	72

[1] Entrance to Imhoff tanks, including Saxonville sewage.
[2] At Pumping Station.

TABLE NO. 2.—*Average Results of the Analyses of Monthly Samples of Sewage as Applied to Filter Beds after Preliminary Treatment as Indicated. (Fats determined in about 64 Per Cent of the Samples.)*

[Parts per Million]

CITY OR TOWN	Form of Preliminary Treatment	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	OXYGEN CONSUMED		IRON		Kjeldahl Nitrogen	Fats
		TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID									
		Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended		Total	Dissolved	Total	Dissolved		
ATTLEBORO	None	434	277	157	237	103	134	50.2	6.89	3.51	3.38	37	50.3	28.6	1.83	.65	15.4	–
BROCKTON	Sedim'n Tanks	532	459	73	241	178	63	51.1	8.13	5.77	2.36	85	85.3	65.5	1.04	.58	15.6	60
Clinton	Sedim'n Basins	480	416	64	306	249	57	23.5	8.38	6.46	1.92	34	101.4	83.0	1.93	.79	17.3	42
Concord	None	241	177	64	119	63	56	18.7	3.18	1.97	1.21	21	28.9	22.2	.63	.29	6.6	–
Easthampton	Sedim'n Tanks	368	271	97	185	99	86	38.7	5.06	3.35	1.71	36	44.3	31.7	.65	.28	10.4	–
FITCHBURG	Imhoff Tanks	274	242	32	123	101	22	18.8	2.82	1.97	.85	30	33.4	26.6	1.82	.97	6.5	22
Framingham	Imhoff Tanks	426	360	66	199	145	54	41.0	5.74	4.40	1.34	44	45.8	33.7	1.44	.75	11.8	41
Franklin	Sedim'n Tanks	538	500	38	146	116	30	28.7	3.10	2.07	1.03	153	35.8	25.2	.98	.54	7.3	–
GARDNER (Gardner Area)	None	678	399	279	424	196	228	43.8	9.50	6.08	3.42	40	92.3	65.5	1.63	.66	23.5	85
GARDNER (Templeton Area)	Sedim'n Tanks	360	289	71	178	117	61	39.5	5.05	3.65	1.40	39	41.9	32.2	1.21	.68	11.0	51
Hopedale	Septic Tanks	312	270	42	164	127	37	43.2	5.15	3.55	1.60	35	43.0	33.5	1.00	.62	12.6	–
Hudson	Sedim'n Tanks	449	335	114	240	141	99	44.8	6.39	3.90	2.49	45	54.1	35.0	1.63	.61	14.1	59
Leicester	None	354	260	94	186	105	81	34.6	6.20	4.26	1.94	27	37.6	26.4	.61	.21	15.5	–
Marion	Sedim'n Tanks	244	221	23	114	94	20	25.0	2.75	1.90	.85	36	26.6	20.5	1.14	.70	6.4	–
MARLBOROUGH	Sedim'n Tanks	489	363	126	256	145	111	43.0	6.52	4.27	2.25	46	47.3	33.9	1.15	.59	12.9	49
Maynard	Imhoff Tank	329	278	51	153	106	47	48.1	4.72	3.22	1.50	47	38.8	30.7	.88	.51	9.5	–
Milford	Sedim'n Tanks	410	353	57	186	143	43	41.5	5.02	3.59	1.43	53	41.1	33.0	1.16	.61	10.1	–
Milford	Imhoff Tank	302	261	41	119	87	32	29.1	3.68	2.68	1.00	41	27.1	17.5	.79	.42	7.6	–
Natick	None	584	347	237	328	136	192	45.3	8.74	4.55	4.19	48	67.0	37.5	1.43	.54	17.0	83
North Attleborough	Sedim'n Tanks	213	189	24	86	69	17	16.5	1.98	1.40	.58	21	19.9	14.2	.78	.41	5.3	–
Northbridge	Sedim'n Tanks	183	147	36	85	57	28	23.9	3.31	2.03	1.28	23	21.4	14.6	.69	.37	7.7	–
PITTSFIELD	Sedim'n Tank	359	303	56	176	132	44	29.7	4.75	2.94	1.81	27	35.9	26.5	1.07	.37	9.8	27
Southbridge	Sedim'n Tanks	457	326	131	257	142	115	41.7	5.12	2.87	2.25	40	56.0	38.5	1.84	1.04	12.9	81
Spencer	None	380	283	97	228	144	84	21.2	6.65	4.24	2.41	27	57.2	39.2	1.17	.53	13.1	50
Stockbridge	None	287	232	55	141	94	47	22.3	2.84	2.24	.60	15	25.5	17.9	.47	.24	6.4	–
Westborough	None	596	297	299	373	140	233	40.6	8.74	5.49	3.25	34	68.7	38.7	1.61	.42	19.2	91
Winchendon	Sedim'n Tanks	225	206	19	86	71	15	20.3	2.52	1.79	.73	30	20.1	14.8	2.20	1.32	5.4	–
WORCESTER	Imhoff Tanks	568	453	115	172	101	71	26.4	3.31	1.71	1.60	80	49.7	26.6	19.33	4.11	8.3	37

TABLE NO. 3.—*Efficiency of Settling Tanks and Other Forms of Preliminary Treatment as Indicated by the Foregoing Tables.*

[Parts per Million]

CITY OR TOWN	Form of Preliminary Treatment	SUSPENDED SOLIDS			TOTAL ALBUMINOID AMMONIA			OXYGEN CONSUMED			FATS			CHLORINE	
		Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage
BROCKTON	Sedimentation Tanks	182.	73.	60.	10.17	8.13	20.	111.5	85.3	23.	69.	60.	13.	92.	85.
Clinton	Sedimentation Basins	645.	64.	90.	17.29	8.38	52.	172.5	101.4	41.	148.	42.	72.	40.	34.
Easthampton	Sedimentation Tanks	137.	97.	29.	6.73	5.06	25.	50.5	44.3	12.	–	–	–	40.	36.
FITCHBURG	Imhoff Tanks	79.	32.	59.	3.54	2.82	20.	37.7	33.4	11.	32.	22.	31.	33.	30.
Framingham	Imhoff Tanks	213.	66.	69.	9.65	5.74	41.	71.7	45.8	36.	75.	41.	45.	42.	44.
Franklin	Sedimentation Tanks	157.	38.	76.	5.21	3.10	40.	57.9	35.8	38.	–	–	–	276.	153.
GARDNER (Templeton Area)	Sedimentation Tanks	212.	71.	67.	9.78	5.05	48.	85.8	41.9	51.	80.	51.	36.	53.	39.
Hopedale	Septic Tanks	537.	42.	92.	12.03	5.15	57.	123.7	43.0	65.	–	–	–	48.	35.
Hudson	Sedimentation Tanks	242.	114.	53.	11.97	6.39	47.	89.7	54.1	40.	97.	59.	39.	52.	45.
Marion	Sedimentation Tanks	172.	23.	87.	3.56	2.75	23.	37.3	26.6	29.	–	–	–	36.	36.
MARLBOROUGH	Sedimentation Tanks	188.	126.	33.	8.33	6.52	22.	61.8	47.3	23.	71.	49.	31.	46.	46.
Maynard	Imhoff Tank	316.	51.	84.	22.52	4.72	79.	81.1	38.8	52.	–	–	–	57.	47.
Milford	Sedimentation Tanks	110.	57.	48.	5.23	5.02	4.	40.7	41.1	–	–	–	–	39.	53.
Milford	Imhoff Tank	110.	41.	63.	5.23	3.68	30.	40.7	27.1	33.	–	–	–	39.	41.
North Attleborough	Sedimentation Tanks	96.	24.	75.	4.34	1.98	54.	34.5	19.9	42.	–	–	–	23.	21.
Northbridge	Sedimentation Tanks	183.	36.	80.	10.10	3.31	67.	60.1	21.4	64.	–	–	–	37.	23.
PITTSFIELD	Sedimentation Tank	101.	56.	45.	5.48	4.75	13.	37.7	35.9	5.	27.	27.	0.	29.	27.
Southbridge	Sedimentation Tanks	242.	131.	46.	7.77	5.12	34.	74.8	56.0	25.	115.	81.	30.	44.	40.
Winchendon	Sedimentation Tanks	169.	19.	89.	7.60	2.52	67.	57.7	20.1	65.	–	–	–	38.	30.
WORCESTER	Imhoff Tanks	324.	115.	65.	5.30	3.31	38.	85.8	49.7	42.	72.	37.	49.	78.	80.

TABLE NO. 4 — *Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.*

[Parts per Million]

Brockton

	RESIDUE ON EVAPORATION						AMMONIA					NITROGEN AS —		OXYGEN CONSUMED				
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended	Chlorine	Nitrates	Nitrites	Total	Dissolved	Kjeldahl Nitrogen	Fats	REMARKS
Settled sewage as applied to trickling filter.	532.	459.	73.	241.	178.	63.	51.1	8.13	5.77	2.36	85.	–	–	85.3	65.5	15.6	60.	Trickling filter has an area of 2.0 acres and a depth of 10 feet of stone from 1.5 to 3 inches in size.
Effluent from trickling filter.	491.	428.	63.	193.	143.	50.	28.4	3.81	2.04	1.77	89.	14.92	.27	46.0	26.1	7.9	15.	One half of filter used alternately. The average rate of operation was about 1,217,000 gallons per acre per day.
Per cent removed .	8.	7.	14.	20.	20.	21.	44.	53.	65.	25.	–	–	–	46.	60.	49.	75.	
Settled effluent from trickling filter.	455.	420.	35.	160.	137.	23.	27.5	2.94	1.62	1.32	90.	16.10	.32	38.3	23.3	6.1	13.	
Per cent removed by secondary settling tank.	7.	2.	44.	17.	4.	54.	3.	23.	21.	25.	–	–	–	17.	11.	23.	13.	Period of sedimentation averaged about 2 hours.
Per cent removed by trickling filter and secondary settling tank.	14.	8.	52.	34.	23.	63.	46.	64.	72.	44.	–	–	–	55.	64.	61.	78.	Tanks cleaned 52 times.

TABLE NO. 4.—*Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.*—Continued.

[Parts per Million]

Fitchburg

	RESIDUE ON EVAPORATION						AMMONIA					NITROGEN AS —		OXYGEN CONSUMED		Nitrogen		
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended	Chlorine	Nitrates	Nitrites	Total	Dissolved	Kjeldahl	Fats	REMARKS
Imhoff tank effluent as applied to trickling filter.	274.	242.	32.	123.	101.	22.	18.8	2.82	1.97	.85	30.	–	–	33.4	26.6	6.5	22.	Trickling filter has an area of 2.14 acres and a depth of 10 feet of stone from 1 to 3 inches in size. The average rate of operation was about 1,749,000 gallons per acre per day for area used (1.86 acres).
Effluent from trickling filter.	275.	233.	42.	124.	98.	26.	7.1	1.66	.81	.85	29.	11.61	.21	17.4	10.9	4.1	–	
Per cent removed .	–	4.	–	–	3.	–	62.	41.	59.	–	3.	–	–	48.	59.	37.	–	
Settled effluent from trickling filter as discharged to Nashua River.	251.	225.	26.	109.	91.	18.	8.4	2.03	1.26	.77	29.	9.57	.15	16.1	11.7	3.5	–	
Per cent removed by secondary settling tanks.	9.	3.	38.	12.	7.	31.	–	–	–	9.	–	18.	29.	7.	–	15.	–	Period of sedimentation about 6.6 hours.
Per cent removed by trickling filter and secondary settling tanks.	8.	7.	19.	11.	10.	18.	55.	28.	36.	9.	3.	–	–	52.	56.	46.	–	Tanks cleaned 6 times.

Maynard

Imhoff tank effluent as applied to trickling filter.	329.	278.	51.	153.	106.	47.	48.1	4.72	3.22	1.50	47.	–	–	38.8	30.7	9.5	–	Trickling filter has an area of .25 of an acre and a depth of 7 feet of stone from 1½ to 2½ inches in size.
Effluent from trickling filter.	371.	333.	38.	167.	138.	29.	23.4	2.82	1.74	1.08	51.	17.56	.33	25.7	18.1	6.6	–	The average rate of operation was about 324,000 gallons per acre per day.
Per cent removed .	–	–	25.	–	–	38.	51.	40.	46.	28.	–	–	–	34.	41.	31.	–	
Settled effluent from trickling filter as discharged to Assabet River.	393.	365.	28.	171.	145.	26.	29.0	2.88	2.00	.88	58.	17.23	.55	25.6	22.0	5.9	–	
Per cent removed by secondary settling tank.	–	–	26.	–	–	10.	–	–	–	19.	–	2.	–	0	–	11.	–	Period of sedimentation about 17.9 hours.
Per cent removed by trickling filter and secondary settling tank.	–	–	45.	–	–	45.	40.	39.	38.	41.	–	–	–	34.	28.	38.	–	Tanks cleaned 3 times.

Milford

Imhoff tank effluent as applied to trickling filter.	302.	261.	41.	119.	87.	32.	29.1	3.68	2.68	1.00	41.	.92	.27	27.1	17.5	7.6	–	Trickling filter has an area of .28 of an acre and a depth of 6 feet of stone from 1 to 1¾ inches in size.
Effluent from trickling filter.	393.	346.	47.	172.	133.	39.	13.4	2.59	1.42	1.17	49.	14.93	.11	24.1	14.8	5.5	–	
Per cent removed. .	–	–	–	–	–	–	54.	30.	47.	–	–	–	59.	11.	15.	28.	–	
Settled effluent from trickling filter as discharged to Charles River.	361.	332.	29.	141.	119.	22.	15.5	1.92	1.22	.70	51.	18.52	.24	17.1	11.5	4.4	–	
Per cent removed by secondary settling tank.	8.	4.	38.	18.	11.	44.	–	26.	14.	40.	–	–	–	29.	22.	20.	–	
Per cent removed by trickling filter and secondary settling tank.	–	–	29.	–	–	31.	47.	48.	54.	30.	–	–	11.	37.	34.	42.	–	

TABLE NO. 4.—*Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.*—Concluded

[Parts per Million]

Worcester

	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	NITROGEN AS —		OXYGEN CONSUMED		Kjeldahl Nitrogen	Fats	REMARKS
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID										
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended		Nitrates	Nitrites	Total	Dissolved			
Imhoff tank effluent as applied to trickling filters.	568.	453.	115.	172.	101.	71.	26.4	3.31	1.71	1.60	80.	–	–	49.7	26.6	8.3	37.	Trickling filters have an area of 13.68 acres and a depth of 10 feet of stone from 1¼ to 3 inches in size.
Effluent from trickling filters	477.	406.	71.	120.	74.	46.	11.6	1.64	.63	1.01	77.	6.11	.32	27.2	11.6	4.1	13.	The average rate of operation was about 1,570,000 gallons per acre per day.
Per cent removed	16.	10.	38.	30.	27.	35.	56.	50.	63.	37.	4.	–	–	45.	56.	51.	65.	
Settled effluent from trickling filters as discharged to Blackstone River.	446.	398.	48.	105.	78.	27.	10.8	1.14	.49	.65	76.	5.56	.27	21.1	10.8	3.2	11.	
Per cent removed by secondary settling tanks.	6.	2.	32.	13.	–	41.	7.	30.	22.	36.	1.	9.	16.	22.	7.	22.	15.	Period of sedimentation averaged about 2.0 hours.
Per cent removed by trickling filters and secondary settling tanks	21.	12.	58.	39.	23.	62.	59.	66.	71.	59.	5.	–	–	58.	59.	61.	70.	

[1] Two samples

Table No. 5.—*Average Results of Analyses of Monthly Samples of Effluent from Sand Filters*

[Parts per Million]

City or Town	Free Ammonia	Total Albuminoid Ammonia	Chlorine	Nitrogen as — Nitrates	Nitrogen as — Nitrites	Iron
ATTLEBORO	16.8	1.09	37.	4.68	.40	5.38
BROCKTON	10.9	.71	82.	17.96	.17	3.23
Clinton	5.8	.74	32.	2.88	.15	12.88
Concord	1.4	.16	23.	9.65	.19	.08
Easthampton	9.6	.65	25.	7.65	.17	3.75
Framingham (new beds)	17.1	1.03	46.	9.34	.17	6.28
Framingham (old beds)	23.0	.97	44.	3.87	.12	8.62
Franklin	9.4	.69	151.	10.59	.06	2.57
GARDNER (Gardner Area)	25.4	1.75	49.	11.04	.34	3.65
GARDNER (Templeton Area)	23.3	1.06	38.	8.62	.33	6.85
Hopedale	16.4	2.07	31.	14.61	.16	.29
Hudson	21.2	1.22	35.	2.95	.13	8.55
Leicester	8.0	.62	17.	5.76	.33	.69
Marion	4.2	.37	33.	12.83	.04	.60
MARLBOROUGH	14.8	.88	40.	9.43	.18	3.25
Milford	35.7	1.15	52.	1.00	.03	7.44
Natick	22.8	1.31	45.	4.36	.12	3.82
North Attleborough	6.5	.30	18.	2.37	.08	3.13
Northbridge	5.1	.53	21.	9.29	.18	.96
PITTSFIELD	13.8	1.13	26.	2.21	.20	2.93
Southbridge	28.5	.71	36.	.45	.01	7.92
Spencer	11.7	.42	26.	.30	.00	13.33
Stockbridge	3.8	.43	14.	4.18	.14	.95
Westborough	8.1	1.08	24.	6.97	.21	2.22
Winchendon	8.7	.50	29.	6.66	.10	.66

Table No. 6.—*Efficiency of Sand Filters* (*Per Cent of Free and Albuminoid Ammonia Removed*)

[Parts per Million]

City or Town	Free Ammonia			Total Albuminoid Ammonia			Chlorine		Rate of Operation with Even Distribution. (Gallons per Acre per Day)
	Applied Sewage	Effluent	Per Cent Removed	Applied Sewage	Effluent	Per Cent Removed	Applied Sewage	Effluent	
ATTLEBORO	50.2	16.8	67.	6.89	1.09	84.	37.	37.	56,000
BROCKTON	51.1	10.9	79.	8.13	.71	91.	85.	82.	–
Clinton	23.5	5.8	75.	8.38	.74	91.	34.	32.	57,000
Concord	18.7	1.4	93.	3.18	.16	95.	21.	23.	107,000
Easthampton	38.7	9.6	75.	5.06	.65	87.	36.	25.	–
Framingham (new beds)	41.0	17.1	58.	5.74	1.03	82.	44.	46.	38,000
Framingham (old beds)	37.0	23.0	38.	10.26	.97	91.	52.	44.	
Franklin	28.7	9.4	67.	3.10	.69	78.	153.	151.	79,000
GARDNER (Gardner Area)	43.8	25.4	42.	9.50	1.75	82.	40.	49..	–
GARDNER (Templeton Area)	39.5	23.3	41.	5.05	1.06	79.	39.	38..	–
Hopedale	43.2	16.4	62.	5.15	2.07	60.	35.	31.	49,000
Hudson	44.8	21.2	53.	6.39	1.22	81.	45.	35.	72,000
Leicester	34.6	8.0	77.	6.20	.62	90.	27.	17.	–
Marion	25.0	4.2	83.	2.75	.37	87.	36.	33.	59,000
MARLBOROUGH	43.0	14.8	66.	6.52	.88	87.	46.	40.	51,000
Milford	41.5	35.7	14.	5.02	1.15	77.	53.	52.	46,000
Natick	45.3	22.8	50.	8.74	1.31	85.	48.	45.	58,000
North Attleborough	16.5	6.5	61.	1.98	.30	85.	21.	18.	92,000
Northbridge	23.9	5.1	79.	3.31	.53	84.	23.	21.	74,000
PITTSFIELD	29.7	13.8	54.	4.75	1.13	76.	27.	26.	113,000
Southbridge	41.7	28.5	32.	5.12	.71	86.	40.	36.	75,000
Spencer	21.2	11.7	45.	6.65	.42	94.	27.	26.	–
Stockbridge	22.3	3.8	83.	2.84	.43	85.	15.	14.	–
Westborough	40.6	8.1	80.	8.74	1.08	88.	34.	24.	39,000
Winchendon	20.3	8.7	57.	2.52	.50	80.	30.	29.	–

TABLE NO. 7.—*Summary of Efficiency of Sewage Disposal Works. (Per Cent Removal from Raw Sewage to Final Effluent).*

[Parts per Million]

City or Town	Suspended Solids			Free Ammonia			Total Albuminoid Ammonia			Oxygen Consumed			Chlorine		Rate of Operation with Even Distribution. (Gallons per Acre per Day)
	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	
ATTLEBORO	–	–	–	50.2	16.8	67	6.89	1.09	84	–	–	–	37.	37.	56,000
BROCKTON	182.	35.	81	62.0	27.5	56	10.17	2.94	71	111.5	38.3	65	92.	90.	–
Clinton	–	–	–	30.2	5.8	81	23.54	.74	97	–	–	–	41.	32.	57,000
Concord	–	–	–	18.7	1.4	93	3.18	.16	95	–	–	–	21.	23.	107,000
Easthampton	–	–	–	40.8	9.6	76	6.73	.65	80	–	–	–	40.	25.	–
FITCHBURG	79.	26.	67	23.4	8.4	64	3.54	2.03	43	37.7	16.1	57	33.	29.	–
Framingham (New Beds)	–	–	–	41.0	17.1	58	9.65	1.03	89	–	–	–	42.	46.	–
Framingham (Old Beds)	–	–	–	37.0	23.0	38	10.26	.97	91	–	–	–	52.	44.	38,000
Franklin	–	–	–	27.1	9.4	65	5.21	.69	87	–	–	–	276.	151.	79,000
GARDNER (Gardner Area)	–	–	–	43.8	25.4	42	9.50	1.75	82	–	–	–	40.	49.	–
GARDNER (Templeton Area)	–	–	–	52.3	23.3	55	9.78	1.06	89	–	–	–	53.	38.	–
Hopedale	–	–	–	42.4	16.4	61	12.03	2.07	83	–	–	–	48.	31.	49,000
Hudson	–	–	–	68.3	21.2	69	11.97	1.22	90	–	–	–	52.	35.	72,000
Leicester	–	–	–	34.6	8.0	77	6.20	.62	90	–	–	–	27.	17.	–
Marion	–	–	–	27.1	4.2	85	3.56	.37	90	–	–	–	36.	33.	59,000
MARLBOROUGH	–	–	–	37.5	14.8	61	8.33	.88	89	–	–	–	46.	40.	51,000
Maynard	316.	28.	91	85.2	29.0	66	22.52	2.88	87	81.1	25.6	68	57.	58.	–
Milford (Sand)	–	–	–	33.2	35.7	–	5.23	1.15	78	–	–	–	39.	52.	46,000
Milford (Imhoff)	110.	29.	74	33.2	15.5	53	5.23	1.92	63	40.7	17.1	58	39.	51.	–
Natick	–	–	–	45.3	22.8	50	8.74	1.31	85	–	–	–	48.	45.	58,000
North Attleborough	–	–	–	18.7	6.5	65	4.34	.30	93	–	–	–	23.	18.	92,000
Northbridge	–	–	–	49.1	5.1	90	10.10	.53	95	–	–	–	37.	21.	74,000
PITTSFIELD	–	–	–	42.4	13.8	68	5.48	1.13	79	–	–	–	29.	26.	113,000
Southbridge	–	–	–	43.6	28.5	35	7.77	.71	91	–	–	–	44.	36.	75,000
Spencer	–	–	–	21.2	11.7	45	6.65	.42	94	–	–	–	27.	26.	–
Stockbridge	–	–	–	22.3	3.8	83	2.84	.43	85	–	–	–	15.	14.	–
Westborough	–	–	–	40.6	8.1	80	8.74	1.08	88	–	–	–	34.	24.	39,000
Winchendon	–	–	–	41.5	8.7	79	7.60	.50	93	–	–	–	38.	29.	–
WORCESTER	324.	48.	85	22.3	10.8	52	5.30	1.14	78	85.8	21.1	75	78.	76.	–

TABLE NO. 8.—*Extent of Sewerage Works, Rate of Flow, and Rate of Operation of Filters*

CITY OR TOWN	Population, Census of 1930	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	ESTIMATED QUANTITY OF SEWAGE TREATED (GALLONS PER DAY)			Estimated Quantity of Sewage per Connection	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Distribution. (Gallons per Acre per Day)
				Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow			
ATTLEBORO	21,769	37.31	1,851	863,000	1,543,000	454,000	466	15.50	56,000
BROCKTON	63,797	–	–	3,092,000 [1]	4,972,000	2,025,000	–	–	–
Clinton	12,817	25.49	1,928	1,503,000 [2]	2,010,000	1,323,000	780	26.23	57,000
Concord	7,477	17.47	746	586,000	936,000	360,000	786	5.48	107,000
Easthampton	11,323	24.87	1,258	–	–	–	–	2.20	–
FITCHBURG	40,692	66.65	–	3,271,000	4,600,000	2,400,000	–	–	–
Framingham	22,210	45.80	3,609	1,165,000	1,757,000	935,000	326	30.89	38,000
Franklin	7,028	14.49	855	255,000	410,000	86,000	298	3.24	79,000
GARDNER	19,399	37.72	2,546	–	–	–	–	16.50	–
Hopedale	2,973	7.08	370	187,000 [3]	223,000	136,000	506	3.79	49,000
Hudson	8,469	14.73	1,160	649,000 [4]	763,000	608,000	559	9.00	72,000
Marion	1,638	4.14	223	114,000	255,000	55,000	512	1.93	59,000
MARLBOROUGH	15,587	36.81	2,653	1,033,000	1,792,000	455,000	389	20.19	51,000
Maynard	7,156	8.33	361	81,000	123,000	62,000	224	–	–
Milford	14,741	25.57	1,818	429,000 [5]	696,000	327,000	–	9.30	46,000
Nantucket	3,678	22.00	1,622	703,000 [6]	928,000	545,000	434	4.00	176,000
Natick	13,589	14.07	1,679	698,000	1,270,000	569,000	416	12.00	58,000
North Attleborough	10,197	17.99	1,046	804,000	–	664,000	768	8.75	92,000
Northbridge	9,713	–	–	892,000	960,000	720,000	–	12.00	74,000
PITTSFIELD	49,677	81.58	6,843	4,605,000	5,521,000	4,129,000	673	41.15	113,000
Southbridge	14,264	23.00	1,725	932,000	1,392,000	428,000	540	12.50	75,000
Westborough	6,409	9.11	611	257,000	583,000	167,000	421	6.62	39,000
Winchendon	6,202	13.00	350	–	–	–	–	4.00	–
WORCESTER	195,311	242.09 [7]	–	21,380,000	27,830,000	17,490,000	–	–	–

[1] Includes an average of 2,433,000 gallons per day to trickling filter and 659,000 gallons to sand filters.

[2] Entire quantity of sewage not treated.

[3] New development not included in average.

[4] Sewage not pumped during summer months.

[5] Records questionable. Amount to sand filters only.

[6] No underdrains. Filters drain direct to ocean.

[7] Includes 70.1 miles of combined sewers.

Table No. 9—*General Features*

City or Town	Year of Construction of and Additions to Works	Depth of Underdrains (Feet)	Distance Apart of Underdrains (Feet)	Filtering Material	Attention given to Disposal Works
Attleboro	1912, 1913	4–7	35	Sand and gravel; found in place	One man all the time; others when necessary.
Brockton	1893, 1905, 1908, 1912	5.5	30	Sand and gravel; found in place; trickling filter.	One chemist in charge, foreman, day and night man; more when necessary.
Clinton	1898, 1899	8	60–70	Sand and gravel; found in place	Two men all the time; others when necessary.
Concord	1899, 1928, 1934	none	–	Sand underlaid with gravel; found in place	One man once a day.
Easthampton	1908	3.5	20–40	Sand and gravel; largely found in place	One man all the time; others when necessary.
Fitchburg	1914	–	–	Trickling filter—10 feet deep	Chemist in charge; 1 foreman, 1 day and 2 night men.
Framingham	1890, 1924 ,1933	–	–	Sand and gravel	One man all the time; others when necessary.
Franklin	1915	4.5	26	Sand and gravel	Very little attention; one man once in a while.
Gardner (Gardner Area)	1891	5	20	Sand; handled in construction	One man all the time; others when necessary.
Gardner (Templeton Area)	1901, 1909, 1931	3–4	20–30	Sand; handled in construction	
Hopedale	1900, 1923	3	35–60	Material—sand and gravel	One man all the time; others when necessary.
Hudson	1904, 1910	5–6	50–100	Sand and gravel; found in place	One man all the time; others when necessary.
Leicester	1894, 1928	4	8	Sand; handled in construction	Very little attention.
Marion	1906, 1930	5	–	Sand; largely found in place	One man every day in summer, every other day in winter.
Marlborough	1891, 1908, 1909, 1910, 1911	4.5–6	30–50	Sand; found in place	One man all the time; others when necessary
Maynard	1929	–	–	Trickling filter, 7 feet deep	One man all the time.
Milford	1907, 1924	5	40	Sand; found in place; trickling filter	One man every day; others when necessary.
Nantucket	1930	–	–	Sand and gravel; found in place	One man when necessary.
Natick	1896	6	36	Sand; found in place	One man all the time; others when necessary.
North Attleborough	1909, 1910, 1931	5–6.5	55	Sand and gravel; found in place	One man every day; others when necessary.
Northbridge	1906, 1907, 1920	4	50–75	Sand and gravel; mostly handled	One man all the time; others when necessary.
Pittsfield	1901, 1915	4	35	Sand; mostly found in place	One man all the time; others when necessary.
Southbridge	1908, 1925, 1926	4	40	Sand and gravel; considerable quantity handled, some found in place.	One man all the time.
Spencer	1897, 1923	–[1]	–	Sand and gravel; largely found in place	One man all the time; others when necessary.
Stockbridge	1899, 1921, 1922	3–4.5 3.4–5	23 30	Sand filters Irrigation area, sand	One man all the time.
Westborough	1892, 1911	5	30–40	Sand and gravel; handled in construction	One man all the time; others when necessary.
Winchendon	1928	–	–	Sand and gravel; found in place	One man part time.
Worcester	1898[2],[3], 1925	4–6	35–50	Trickling filters, sand area not in use	Chemist in charge; several men all the time.

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[1] Only three beds underdrained.

[2] Year of first construction of sand filters. Many additions

[3] Sedimentation tanks and sand beds abandoned 1925. Imhoff tanks, trickling filters and secondary tanks installed.

EXAMINATION OF SEWER OUTLETS DISCHARGING INTO THE SEA

Special examinations were made during the year of the main sewer outfall of the South Essex Sewerage District called for under Chapter 49 of the Resolves of 1934, and in connection with this investigation consideration was given to the disposal of sewage through the outfall sewers at Gloucester, Manchester and Marblehead. Late in the year the Department extended the time for the completion of the Brant Rock sewer outlet at Marshfield.

INVESTIGATIONS RELATIVE TO SHELLFISH

As has been the practice in recent years, the Department has considered the various applications and petitions received relative to the removal of restrictions on the taking of shellfish at certain areas along the sea coast and has removed the restrictions from Long Beach in Swansea, Stony Beach in Hull and from a portion of Hingham Harbor.

There has been considerable activity relative to the approval of certificates for the shipment of shellfish into this State from other producing states and provinces, and 328 out-of-state shellfish certificates have been approved. In connection with the shipment of certain shucked stock it became necessary in the latter part of the year to communicate with the authorities of a southern state because of shipments of polluted shucked oysters from certain shellfish dealers in that state. Later examinations of shucked oysters from that state have shown them to be in a satisfactory condition and information available to this Department would indicate that, in part at least, because of the objections raised by this Department, more rigid supervision of shucked shellfish has been exercised in the state in question. Ten cases have been tried against dealers handling polluted shellfish, and in all but one instance convictions have been obtained. Representatives of the Department have attended various hearings held by the Supervisor of Marine Fisheries relative to the cancellation of certificates because of improper use of these certificates and because of insanitary shucking facilities. Under the new law enacted in 1933 (Chapter 329) all persons dealing in shellfish commercially are required to have certificates issued by the Supervisor of Marine Fisheries in connection with which inspections are now made by this Division before certificates for shucked stock are issued. In accordance with the agreement between the Supervisor of Marine Fisheries and this Division, nearly 600 inspections have been made of shucking plants, and the Supervisor has been notified when the shucking plants are in proper sanitary condition in order that the necessary certificates might be issued. This has been the first full year when the Department has had the opportunity to supervise shellfish shucking establishments, and this is believed to be one of the most important steps thus far taken in improving such establishments. The continuation of this work by those primarily interested in matters of sanitation appears to be essential if the State is to have proper sanitary control of this food product.

The Department has continued its general supervision of shellfish chlorinating plants. The plants at Newburyport and Plymouth have been in operation throughout the year and the plant at Scituate was in operation from July 13 to October 22. A total of some 36,000 barrels of soft shell clams were treated at the three plants during the year.

SPECIAL INVESTIGATIONS

The Engineering Division has assisted in three special investigations during the past year, viz: under Chapter 12 of the Resolves of 1934, relative to the use of certain lands and waters in the Commonwealth for recreational purposes which was made jointly with the Department of Conservation and the Metropolitan District Commission; under Chapter 32 of the Resolves of 1934, relative to the condition of Lake Quinsigamond which was made jointly with the Department of Public Works; and under Chapter 49 of the Resolves of 1934 relative to the South Essex Sewerage District which was also made jointly with Department of Public Works. The reports required under these resolves have been submitted to the Legislature.

PUBLIC WORKS, CIVIL WORKS AND FEDERAL EMERGENCY RELIEF ADMINISTRATION PROJECTS

Much of the time of the Division has been taken up during the year 1934 with the investigation of various construction projects undertaken through Federal agencies, viz: the Public Works Administration, the Civil Works Administration and the Federal Emergency Relief Administration. In this connection the following water, sewerage and sewage disposal works have been approved for construction by the Federal authorities in accordance with their program:

Construction under PWA

Town or City	*State Institutions*	
Canton	Massachusetts Hospital School	Sewers connecting with the Canton sewerage system
Lakeville	Lakeville State Sanatorium	Sewage disposal works
Monson	Monson State Hospital	Sewage disposal works
Norfolk	State Prison	Dug well and tank
Norwell	State Police Barracks	Water supply and sewage disposal
Rutland	Rutland State Sanatorium	Sewers and drains
Tewksbury	State Infirmary	New water supply
Topsfield	State Police Barracks	Water supply and sewage disposal
Waltham	Walter E. Fernald State School	Sewers
Westfield	Westfield State Sanatorium	Sewage disposal works
Yarmouth	State Police Barracks	Water supply and sewage disposal
	Total Estimated Cost	$308,300

Cities and Towns

Chelmsford	East Chelmsford Water District	Public water supply
Georgetown	Public water supply	
Great Barrington	Fire and Water District	Additional water supply
Haverhill	Construction of sewers	
Lowell	Construction of sewers	
Marlborough	Improvement in sewage disposal works	
Methuen	Construction of sewers	
Natick	Sewage disposal works	
Newburyport	Water filters	
North Adams	Trunk sewers and sewage disposal works	
Paxton	Public water supply	
Sterling	Public water supply	
Taunton	Construction of trunk sewer	
Townsend	Public water supply	
Weymouth	Water filters	
Williamstown*	Construction of sewers	
Winthrop	Sewage pumping station	
Worcester	Improvement in sewage disposal works	
	Total Estimated Cost	$1,830,000

Construction under CWA or FERA

Amherst	Sewers	
Attleboro	Improvements at sewage disposal works	
Bridgewater	State Farm—sewage disposal works and reconstruction of water filters	
Concord**	Improvements at sewage disposal works	
Foxborough	Sewers	
Hudson	Improvement at sewage disposal works	
Leominster	Sewage disposal works and water filters	
North Attleborough	Improvements at sewage disposal works	
Palmer	Sewers	
Pittsfield	Improvement at sewage disposal works	
Southbridge	Improvements at sewage disposal works	
Spencer	Sewage disposal works	
Salem and Beverly	Water filters	
Tewksbury	State Infirmary—sewage disposal works	
	Total Estimated Cost	$1,361,000

*Not accepted by town. Constructed under town appropriation.
**No plans submitted.

EXAMINATIONS OF RECREATION CAMPS AND ROADSIDE STANDS

Matters of water supply and sewerage, garbage and refuse disposal, etc., at recreation camps and roadside stands were investigated, so far as practicable, by this Division during the past year, but the number of examinations was limited because of the large amount of new work required of the Division.

CIVILIAN CONSERVATION CORPS CAMPS

During the year 29 examinations of Civilian Conservation Corps Camps were made by representatives of the Engineering Division and special advice given by the Department in matters of water supply, sewerage and sewage disposal. Under arrangements made with the Corps Surgeon of the First Corps Area of the U. S. Army, 536 samples of water from these camps have been examined bacterially at frequent intervals by this Department, and the results communicated to him.

The following table shows the location of the Civilian Conservation Corps Camps established in this State, the sources of water supply and the bacterial condition of the water. Sewage disposal is generally by means of latrines or cesspools.

Location of Camp			*Water Supply*				
					BACTERIAL CONDITION (B.Coli-Aerogenes)		
					(1 cc)	(10 cc)	
U. S. No.	City or Town	Reservation—(R.) or State Forest—(S.F.)	Source	Treatment	% Positive	% Positive	% Negative
2142	Andover	Harold Parker (S. F.)	Drilled Well	Chlorinated	0	17	83
4103	Andover	Harold Parker (S. F.)	Dug Well	Chlorinated	0	2	98
2154-1	Becket	October Mountain (S. F.)	Well	–	0	20	80
			Brook	Chlorinated	0	16	84
2154-2	Becket	October Mountain (S. F.)	Well	–	0	30	70
			Brook	Chlorinated	0	0	100
2164-1	Bourne	Shawme (S. F.)	Tubular Wells	–	0	0	100
2164-2	Bourne	Shawme (S. F.)	Tubular Wells	–	0	0	100
2147	Brimfield	Brimfield (S. F.)	Dug and Drilled Wells	–	0	3	97
2162	Charlemont	Mohawk Trail (S. F.)	Springs	–	0	4	96
2149	Chester	Chester-Blandford (S. F.)	Brook	Chlorinated	13	43	57
2199	Chicopee	Chicopee Water Supply (R.)	City Supply	Filtered and Chlorinated	0	0	100
4107	Douglas	Douglas (S. F.)	Drilled Well	Chlorinated	0	40	60
2165	Edgartown	Vineyard Haven (S. F.)	Tubular Wells	–	0	0	100
2146	Erving	Erving (S. F.)	Dug Wells	Chlorinated at times	0	0	100
2171	Fall River	Fall River Water Supply (R.)	City Supply	Chlorinated	0	0	100
2169	Foxborough	Foxborough (S. F.)	Town Supply	–	0	0	100
4108	Freetown	Freetown (S. F.)	Drilled Well	–	0	0	100
2148	Goshen	Conway and D.A.R. (S. F.)	Drilled Well	–	0	0	100
2150	Granville	Granville (S. F.)	Springs and Dug Well	–	0	4	96
2153	Great Barrington	Beartown (S. F.)	Springs	–	0	10	90
2170	Milton	Metropolitan Parks (R.)	Metropolitan Supply	Chlorinated	0	0	100
2157	Monroe	Monroe (S. F.)	Brook	Chlorinated	0	7	93
2151	Otis	Otis (S. F.)	Spring and Wells	–	0	4	96
2155	Peru	Peru (S. F.)	Spring and Well	–	0	0	100
2159	Pittsfield	Pittsfield (S. F.)	Brook	–	0	11	89
2163-1	Plymouth	Myles Standish (S. F.)	Tubular Wells	–	0	11	89
2163-2	Plymouth	Myles Standish (S. F.)	Tubular Wells	–	0	0	100
2152	Sandisfield	Sandisfield (S. F.)	Spring	–	0	3	97
2158	Savoy	Savoy Mountain (S. F.)	Springs	–	0	0	100
4106	Savoy	Savoy Park (S. F.)	Spring and Well	Chlorinated	0	0	100
2160	Spencer	Spencer-Oakham (S. F.)	Tubular Wells	–	0	20	80
2161	Tolland	Tolland (S. F.)	Well	–	0	80	20
2145	Wendell	Wendell (S. F.)	Dug Well	–	–	0	100
2143	Westminster	Leominster (S. F.)	Well	–	0	1	99
			Brook	–	0	0	100
2198	Williamstown	Mt. Greylock (R.)	Brook	–	0	20	80
2144	Winchendon	Otter River (S. F.)	Tubular Wells	–	0	0	100
2156	Windsor	Windsor-Hawley (S. F.)	Springs	–	0	4	96
			Brook	–	30	60	40

Examination of Bathing Places

A limited number of examinations were made in connection with certain bathing places throughout the State. In most instances the waters were found to be of reasonably satisfactory quality for this purpose. The following bathing places were examined and replies from the Department forwarded relative thereto:

Advice Relative to Bathing Places and Swimming Pools

Abington	Island Grove Pond
Agawam	Mill Pond at Agawam Center
Amesbury	Amesbury Park (swimming pool)
Amherst	Stream passing proposed playground
Andover	Pomp's and Husseys ponds
Arlington	Spy Pond and Reservoir at Arlington Heights
Ashland	Construction swimming pool and filter
Ashland	Swimming Pool at Camp Bob White
Ashland	Swimming Pool at Golden Ring Camp
Beverly	Swimming Pool at Y.W.C.A.
Beverly	Dane Street Beach
Billerica	Concord River at Camp Naomi
Boston	North End Beach
Boxford	Stiles Pond at Camp Rotary
Braintree	Weymouth Fore River at Watson Field near East Braintree
Braintree	Swimming pool at Norfolk County Sanatorium
Chelmsford	Crystal Lake and Hart Pond
Chelsea	Chelsea Creek near Marginal Street
Concord	Sudbury River at Camp of Henry S. Thompson
Danvers	Putnams Pond
Danvers	Porter River at High School
Dartmouth	Noquochoke Lake
Dartmouth	Jones Park and Anthony's Beach
Dighton	Taunton River
East Longmeadow	Pool, westerly side Shaker Road
Foxborough	Sunset Lake
Framingham	Learned Pond
Haverhill	Little River
Holden	Swimming pool, Dawson Village
Lowell	Swimming pool at Rogers Hall
Lynn	Sluice and Flax ponds
Natick	None Such Pond at Camp Mary Day
Natick	Dug Pond and Charles River at South Natick
Needham	Rosemary Lake
Newburyport	Merrimack River
New Salem	Little Speck Pond at Morgan Memorial Fresh Air Camp
Newton	Crystal Lake
Norwood	Hawes Brook
Peabody	Wading pool at Perkins Park
Peabody	Brown's Pond
Plymouth	Boot Pond
Plymouth	Hedges Pond at Emmanuel Camp
Plymouth	Darby Pond at Camp Annawon
Quincy	Blacks Creek
Rutland	Swimming Pool at Rufus Memorial Park
Rutland	Eagle Lake (bathing facilities)
Saugus	Saugus River at Stocker Playground, East Saugus
Southbridge	Cohasse Brook at Elm Street (and Wells Pond)
South Hadley	Pond on Batchelor Brook (Camp Lewis Perkins)
Stow	Swimming pool at Stow Golf Club
Wakefield	Quannapowitt Lake
Walpole (East)	Swimming pool at Francis William Park
Waltham	Charles River at Peterson icehouse
Waltham	Charles River at Forest Grove

Ware	Swimming pool on Muddy Brook (reconstruction)
Watertown	Charles River Basin near Perkins Institute
Weymouth	Whitman's Pond
Wilmington	Silver Lake
Windsor	Windsor Pond
Winthrop	Winthrop Harbor

Ventilation Standards

On September 20, 1932, the Public Health Council adopted certain ventilation standards to be used by the Department of Public Safety in the exercise of their duties under the General Laws in matters of ventilation at places used for human occupancy, and in all buildings in which ventilation requirements are to be established. These standards read as follows:

APPROVED BY DEPARTMENT OF PUBLIC HEALTH ON SEPTEMBER 20, 1932

PROPOSED VENTILATION STANDARDS FOR SPACES INTENDED FOR HUMAN OCCUPANCY IN ALL BUILDINGS FOR WHICH VENTILATION REQUIREMENTS ARE TO BE ESTABLISHED.

After conference with those informed in the various aspects of the science of ventilation, the Public Health Council of the Massachusetts Department of Public Health approves the following ventilation standards for spaces intended for human occupancy to assist the Department of Public Safety in promulgating rules for ventilation in all buildings for which ventilation requirements are to be established.

Section 1—Air Temperature and Humidity

The condition of the air in such occupied spaces in which the only source of contamination is the occupant shall be maintained at all times during occupancy at a comfortable "effective temperature."

The effective temperature shall range between 64 degrees and 69 degrees when heating or humidification is required, and between 69 degrees and 73 degrees when cooling or dehumidification is required. It is desirable that the relative humidity shall not be less than 30 per cent nor more than 60 per cent in any case.

These effective temperatures shall be maintained at a level of 36 inches above the floor.

Section II—Air Quality

The air in such occupied spaces shall be at all times free from toxic or disagreeable gases and fumes and shall not contain odors and dust in objectionable amounts.

Section III—Air Motion

The air in such occupied spaces shall be in sufficient motion to maintain a reasonable uniformity of temperature and humidity, but not such as to cause objectionable drafts in any occupied portion of such spaces. (An air motion of more than 50 feet per minute within the range of effective temperature prescribed is ordinarily considered objectionable.)

Section IV—Air Distribution

The air in all rooms and enclosed spaces shall, under the provisions of these requirements, be distributed with reasonable uniformity.

Section V—Air Quantity

The quantity of air used to ventilate the given space during occupancy shall always be sufficient to maintain the standards of air temperature, air quality, air motion and air distribution as herein required. Sufficient air to meet the above standards shall be taken from an unpolluted outdoor source through a window or other opening supplied with air of suitable quality unless effective means for the removal of objectionable odors and impurities are used. Nothing in this section shall be construed as preventing occasional flushing of rooms with outside air.

Section VI—Definitions

Effective Temperature and its Measurement—Effective temperature, sometimes known as the thermal index of atmospheric conditions, is an experimentally determined index of the degree of warmth or cold felt by the human body in response to temperature, humidity and the movement of the air. It is a composite index which combines the readings of temperature, humidity and air motion in a single value and may be determined from thermometric charts, copies of which may be obtained by making application to the Department of Public Safety, Room 24, State House, Boston. (The Department of Public Safety should be equipped with copies of charts similar to those published in the American Society of Heating and Ventilating Engineers Guide, 1932, page 392.)

Relative Humidity—Relative humidity is the measure of the per cent saturation of the air with water vapor. It is the ratio of the actual amount of water vapor in a unit volume or unit weight of air at any given temperature to the maximum amount of water vapor which the air would hold at the same temperature when fully saturated with moisture. It may be determined from the dry and wet bulb temperatures, readings taken with a sling psychrometer, and using the Carrier psychrometric chart for computation.

Air Motion.—Air motion is the velocity of air current in rooms and should include not only the linear movement of the air but also the turbulence or eddying currents produced by air changes. The air movement or turbulence in occupied rooms should be determined by means of the Kata thermometer. (The velocity of the air is not likely to fall below 10 feet per minute which is adequate even in tightly sealed rooms if there is a temperature or pressure difference between the air inside and outside the room.)

These standards have never been adopted by the Department of Public Safety but a committee was appointed by General Daniel Needham, former Commissioner of Public Safety, in September, 1934, to consider the question of making changes in the regulations of the Department of Public Safety in matters of heating and ventilation of public buildings. This committee consists of the following:

Arthur D. Weston, Chairman

Francis V. Bulfinch
G. Houston Burr
Morris W. Maloney
Alfred Kellogg
Leslie Clough
Ralph S. Franklin
P. A. L. Foulds
Hollis French
Burr F. Jones
Fayette K. Congdon
Ernest Stephens
C. Harold Berry
James Holt
Jeremiah J. Carey

EFFECT OF POLLUTED WATERS FOR PURPOSES OF HUMIDIFICATION

Recent research work under William F. Wells of the Harvard School of Public Health relative to the bacterial content of air warranted this Division making further studies in connection with the use of water at certain industrial plants for humidifying purposes. No extensive studies in such matters have been made by the Department since the year 1912 when a report was made by Messrs. Clark and Gage of the Lawrence Experiment Station. The applications of humidification to industrial operations have meanwhile been greatly extended and have also become a basic factor in air conditioning.

Research work of Mr. Wells on the viability of pathogenic organisms introduced into the atmosphere by evaporating droplets has awakened considerable interest, and these experiments might indicate possible contamination of the air of textile mills through humidifying processes. The facilities of the Harvard School of Public Health afforded an exceptional opportunity for a cooperative study and arrangements were accordingly made for the services of Mr. Wells and one of his assistants during the summer of 1934. These studies included tests in textile mills and tests in the laboratory at the Harvard School of Public Health.

The preliminary studies at the School of Public Health showed that in experimental air conditioning enormous numbers of B. coli introduced into water used for humidification were thrown into an air-conditioned room in the basement and that the waste air from that room carried large numbers of these bacteria to various parts of the building. B. coli atomized into the room disappeared at a much higher rate when the humidifier was in operation than when the conditioner was re-circulating the air without the use of the spray. Further tests showed that the reduction in the number of bacteria did not take place in the spray chamber but after the air had returned to the room and indicate that humidity might increase the death rate of the B. coli in the air.

The work of Clark and Gage published in the Annual Report of this Department of the year 1912 showed that, while the high bacterial content of the air in textile mills comes largely from the bacteria laden dust thrown up by mechanical operations, numbers are also found where polluted water is used in the humidification system. One of the objects of Mr. Wells' recent work was to determine the degree each contributed to the bacterial contamination of the mill air, and so far as possible to judge the danger from breathing the air. Some distinctions can be made between the types of organisms derived from the different sources even though it was not practical to isolate and identify particular organisms which might have pathogenic significance. Supplementary evidence from Mr. Wells' work disclosed the fact that the nuclei from evaporating droplets from the spray do not settle rapidly on agar plates but can be recovered by centrifuging the air. Bacteria laden particles from the mechanical operations, however, settle relatively rapidly onto plates. By carrying out both these procedures it was possible to indicate the proportion contributed from each source. In this way he was able to demonstrate that contaminated water used in humidification was the principal source of bacteria in heavily humidified weaving rooms. In spinning rooms where the air is humidified to a lesser degree a smaller proportion of bacteria from this source was indicated, while in the dusty operations in carding, breaking and sorting rooms, which usually are not humidified, most of the bacteria were associated with dust particles.

The atmosphere outside of factories also showed a very large proportion of rapidly settling dust laden bacteria, contrasting sharply with the atmosphere in the vicinity of the laboratory. Greater numbers of B. coli also were found in weaving than in spinning rooms, being readily recovered in small numbers under sprays of polluted water. Since higher numbers were also found in the dusty non-humidified rooms, they may apparently be obtained from either source.

It was gratifying to learn from the studies recently made that the air in cotton mills was in a much better condition than was found in the studies of Clark and Gage so far as the bacterial count from both sources is concerned. The woolen mills did not show as much improvement as did the cotton mills, but it was evident, however, that efforts to control dust and to secure pure water for humidification have resulted in an improved bacterial condition of the air in such industries. Further improvement is possible, especially in providing unpolluted sources of water supply in humidifying systems.

Relation to Sanitary Ventilation

It may not be out of place here to mention how this study has fitted into a broader sanitary investigation of air supplies. The application of the methods to the problems of general ventilation have been continued at the Harvard School of Public Health, and Mr. Wells has since demonstrated that thousands of droplets containing Streptococcus viridans and Micrococcus catarrhalis are expelled by sneezing into the atmosphere, and these can be largely smothered by the use of a handkerchief. In the air of crowded rooms he finds these organisms prevalent, along with large numbers of general types, and it now appears that the methods of bacterial analysis of air used in the study may serve in the development of air supply control as has sanitary water analysis in the sanitary control of water supplies.

WATER AND SEWAGE LABORATORIES AND LAWRENCE EXPERIMENT STATION

The activities of the Water and Sewage Laboratories and the Lawrence Experiment Station are divided between analytical work and research. Methods are developed and many investigations concerning water, sewage, industrial wastes, shellfish, and many other sanitary problems are made by means of laboratory and field work, the operation of various kinds of filters, tanks and other apparatus. During the year 1934 an unusually large volume of work was accomplished by both units and is briefly described in the following pages.

WATER AND SEWAGE LABORATORIES

The work of the Water and Sewage Laboratories consists mainly in carrying out the routine analyses of drinking water supplies and sewages. There are, however, many special analyses made which are necessitated by a wide range of investigations, such as the composition of deposits, of incrustations and sediments in pipe lines and of waters used in connection with certain commercial operations.

Among the experimental studies made during the year was one having to do with the appearance of blue water in porcelain bowls and bathtubs. Using three waters, having colors of 0, 17 and 140 parts per million, respectively, the concentration of copper was noted at the first appearance of blue water, with and without the addition of soap, and the results are summarized in the following table:—

(Parts per Million)

Color	Concentration of Copper	
	Without Soap	With Soap
0	10–20	0.5– 1.0
17	25–50	0.7– 1.0
140	–	2.6–20.0

This work was carried on in a white porcelain dish, 12 inches in diameter and with a depth of water of 2½ inches. With a greater depth of water, such as in a bathtub, the concentration would decrease proportionately.

Studies were begun in regard to a comparison of three methods of determining free ammonia in municipal sewages and effluents, using sodium carbonate giving a pH of over 9.0, phosphate buffer of pH 7.4, and direct nesslerization. Results thus far obtained would indicate in most cases that the largest amount of free ammonia is obtained through the use of sodium carbonate; but the differences between the three methods are small and may not be greater than the error of the determination.

Another study had to do with the comparison of three methods of determining suspended solids in sewages, namely, alundum crucible, Gooch crucible, and by filter paper. The work thus far carried out indicates that while the crucible methods compare favorably with each other, the results obtained by the filter paper method are dependent upon the particular type of filter paper used. Further work is being done along this line.

The following table gives a summary of the analytical work carried on in the State House laboratories:

Water and Sewage Laboratories, State House

Samples from public water supplies:	
Surface waters	2,418
Ground waters	1,401
Special samples:	
Surface waters	171
Ground waters	672
Samples from rivers	1,357
Samples from sewerage systems and sewage disposal works	1,332
Samples of wastes and effluents from factories	66
Samples of sea water	13
Samples analyzed in connection with the Salem Harbor investigation	284

Samples analyzed in connection with the Lake Quinsigamond investigation	67
Miscellaneous samples (partial analyses)	227
Special examinations of water (including field work) for manganese, lead, copper, zinc, residual alum, oil, alkalinity, fats, dissolved oxygen, carbonic acid, and hydrogen ion	2,823
Microscopical examinations	2,858

Lawrence Experiment Station

During the year 1934 much field work was done by the staff of the Lawrence Experiment Station in connection with the examination of rivers, water supplies, swimming pools, and sewage filtration areas. Considerable attention was paid to the condition of shellfish and shellfish areas, and a bacteriologist from the Station was in court thirteen times to testify in shellfish prosecutions by the Department. Many reports were made in regard to sewage and trade wastes disposal, water purification, chlorine treatment, the condition of water supplies, swimming pools, bathing beaches, the removal of free carbon dioxide from water supplies, and the results of other field work of various kinds.

Studies were continued relative to the disposal of ammonia-still waste from a gas plant, and sand and trickling filters were operated at the Experiment Station with such waste mixed with domestic sewage. The final conclusion of this work was that when this waste is mixed with sewage in the proper proportion, it may be permitted to enter sewers without ill effect on the operation of municipal filtration plants.

Further work was carried on in regard to the removal of caustic lime from the wastes of the Salem-Peabody industrial plants handling leather, felt, and gelatin, as this type of waste forms a progressively thickening scale of calcium carbonate in the sewers. As during the year 1933, the work during the year 1934 in this regard was largely to learn how much caustic lime is removed from the wastes at the industrial plants where such wastes are carbonated with flue gas. The results of this work show the effectiveness of these carbonating devices and that only occasionally does caustic lime reach the outfall sewer of the South Essex Sewerage District.

The Experiment Station assisted in an extensive investigation of the sewerage works of the South Essex Sewerage District, under Chapter 49 of the Resolves of 1934, by studying and analyzing the trade wastes entering the Salem-Peabody sewers. An experimental plant was operated for about three months near the Salem-Peabody sewage pumping station to study the removal of fats by skimming and sedimentation of suspended solids. Many analyses were made of grease balls found along the Salem and Beverly shores.

Much research work on methods of sewage purification and water treatment was carried on at the Experiment Station and in this connection the study of the relative efficiency of aeration and chlorination of sewage, as preliminary treatment before filtration, was continued. A study was started of the disposal of a distillery waste; relative stability tests were made on the effluents from many of the municipal sewage disposal areas; a large amount of research work was carried on in connection with certain corrosion studies with the assistance of the engineers; and B.O.D. tests were made on the Merrimack River water and plans were consummated for extending these tests to a number of rivers and sewage disposal areas.

As slow sand filtration has proved to be an effective and important method of sewage disposal in Massachusetts and as properly constructed and operated filters of this type are very efficient, studies have been made at the Lawrence Experiment Station during the past three years to demonstrate the results of intelligent and unintelligent operation of such filters. In connection with this work, seven filters are in operation at the Station, each one receiving an equal volume of sewage but in varying ways. The first filter is flooded daily; the second, every second day with twice the dose of the first filter, and so on. The seventh filter, which is flooded only every seventh day, receives on this day the same volume of sewage as the filter flooded daily receives in seven days. As is to be expected, the effluents from the first to the seventh filter are progressively poorer in quality. Further work along this line, to show the varying efficiency of filters of different depths, has been continued.

The important study, which was begun five years ago, in regard to the purification of the very polluted Merrimack River water by storage was continued throughout the year 1934. In this study the river water is passed through underground tanks, containing seven compartments, at such a rate that during the year it received, theoretically, thirty days' storage. By this storage, the number of bacteria of the coli-aerogenes group has been reduced from 3,600 to 8 per 100 cubic centimeters, thus showing the great efficiency of purification by storage for a water even as polluted as that of the Merrimack River.

A study also was started to determine the amount of iron taken up by water in passing through different materials. This is of interest in connection with ground water supplies.

As has been the custom for the past forty-one years, the Experiment Station force has maintained a general oversight of the operation and the bacterial efficiency of the Lawrence city filters, both by inspection of the chlorine plant and by the almost daily bacterial examination of samples of the water before and after filtration. This has been necessary as during all these years the city has never employed a trained operator at the filters or established a laboratory there. In addition, all water and sewage bacterial work, including such work in connection with the general oversight of inland waters, has been done at the Lawrence Experiment Station.

The State House laboratories and the Lawrence Experiment Station, as usual, have been visited during the year by many persons interested in water and sewage purification, analytical and other work, including representatives of various colleges. A number of these visitors were from foreign countries.

The analytical work carried on at the Station is summarized in the following table and a resumé of some of the research work is submitted in the following pages:

Lawrence Experiment Station

Chemical examinations on account of investigations concerning the disposal of domestic sewage and factory wastes, filtration and other treatment of water supplies, swimming pools, and the investigation of the Merrimack and other rivers	2,668
Mechanical and chemical examinations of sands	326
Bacterial examinations of water supplies, rivers, sewage and filter effluents, ice, swimming pools, and wastes	7,505
Bacterial examinations in connection with methods of purification of sewage and water	633
Bacterial examinations of shellfish and sea waters	653

SHELLFISH

During the year, 523 samples of shellfish and 130 samples of sea water were examined. One hundred and forty-three of the shellfish samples were from the Food and Drug Division, necessitating thirteen appearances in court of a bacteriologist in prosecutions concerning polluted shellfish. As a part of the experimental work, quahogs with a shellfish score of 14 were planted for three days near a sewer outlet on the Newburyport flats. The score of these shellfish after planting was 140 but after twenty-four hours in the tanks at the Newburyport shellfish purification plant, the score was reduced to 23 and in forty-eight hours, to 14.

TANNERY WASTES

Many determinations were made of lime and various forms of alkalinity in wastes from Salem and Peabody tanneries and allied industries to check the efficiency of the carbonating plants. Caustic lime in the wastes from some of these plants, unless converted to calcium carbonate by blowing flue gas through the wastes, causes deposits of calcium carbonate in the sewers and in the outfall sewer. As a part of the investigation of the sewerage system of the South Essex Sewerage District, as required under Chapter 49 of the Resolves of 1934, 704 samples were examined. The results of this work are contained in a special report to the Legislature.

WASTE FROM THE MANUFACTURE OF ILLUMINATING GAS

For the purpose of advising a municipality relative to the discharge of gas wastes into the sewerage system which has an outlet in sewage disposal works, studies were made during 1932 and 1933 of the treatment of gas wastes when mixed with sewage and a part of these studies was continued in 1934.

The waste used was the residue from the ammonia-still, containing on an average over 5,000 parts per million of organic matter (shown by loss on ignition), 1,000 parts per million of free ammonia and 6,000 parts per million of oxygen consumed. One-half of one per cent of this waste mixed with Lawrence sewage was applied to a sand filter and to a trickling filter. This amount was twice the proportion of this waste that would be mixed with the domestic sewage at the municipal sewage treatment works under consideration if all the ammonia-still liquor from the gas plant in question were discharged into the sewer.

One sand filter, No. 591, containing 3½ feet in depth of sand of an effective size of .25 millimeter was operated as a control with Lawrence sewage at a rate of 50,000 gallons per acre daily. Filter No. 592, of similar construction, received the mixture of sewage and waste at the same rate. Two small trickling filters, containing 10 feet in depth of crushed stone, were operated also in connection with the treatment of this waste: No. 614 as a control and No. 615 with the mixture of sewage and waste, both being operated at a rate of 1,400,000 gallons per acre daily.

At this municipal plant, it is the practice during the warmer months to refilter the settled trickling filter effluent on sand filters, flooding each one about every third day. Consequently, two small sand filters were operated at the Experiment Station with the settled effluent of trickling Filter No. 615. The first, No. 618, was flooded every day at a rate of 75,000 gallons per acre daily, and the second, No. 619, received 225,000 gallons every third day. Another filter, No. 617, received the settled effluent of trickling Filter No. 614 at a rate of 75,000 gallons.

The effluent of the trickling filter receiving waste was somewhat higher in color and organic matter than that from the control filter but was still of good quality. The sand filter flooded daily with this settled effluent produced a greater reduction in color and organic matter than the filter flooded only every third day but showed a somewhat lower reduction than the corresponding filter receiving no waste.

From the results of three years' operation of filters at the Experiment Station, it is evident that the discharge of this waste into the sewers at a uniform rate will have no ill effect on the operation of either trickling or sand filters. The effluents may contain a little more organic matter but it will be in an unobjectionable form.

Average Analyses of Samples of Sewage and Sewage Effluents Relative to the Treatment of Gas Waste (Ammonia-Still Liquor) with Domestic Sewage

(Parts per Million)

Color	AMMONIA			Chlorine	NITROGEN AS—		Oxygen Consumed
	Free	ALBUMINOID			Nitrates	Nitrites	
		Total	In Solution				
Settled Sewage applied to Slow Sand Filter No. 591 (no gas waste added)							
–	38.6	6.7	3.8	57	–	–	39.9
Effluent from Slow Sand Filter No. 591 (no gas waste added)							
12	.26	.21	–	54	30.8	.015	2.1
Settled Sewage and Gas Waste (0.5%) applied to Slow Sand Filter No. 592							
–	51.4	7.3	4.4	63	–	–	66.9
Effluent from Slow Sand Filter No. 592 (0.5% gas waste added)							
17	.83	.29	–	67	32.9	.011	2.9
Settled Sewage applied to Trickling Filter No. 614 (no gas waste added)							
–	38.2	7.8	4.8	56	–	–	44.6
Effluent from Trickling Filter No. 614 (no gas waste added)							
53	11.4	2.4	1.0	55	23.8	.386	14.1
Settled Sewage and Gas Waste (0.5%) applied to Trickling Filter No. 615							
–	48.4	8.8	5.7	72	–	–	81.5

Effluent from Trickling Filter No. 615 (0.5% gas waste added)							
91	14.8	2.7	1.2	67	21.7	.239	19.6
Effluent from Slow Sand Filter No. 617 receiving Settled Effluent from Trickling Filter No. 614							
15	.15	.10	–	57	26.6	.077	2.3
Effluent from Slow Sand Filter No. 618 receiving Settled Effluent from Trickling Filter No. 615.—Flooded Every Day							
18	.24	.25	–	69	31.3	.176	2.5
Effluent from Slow Sand Filter No. 619 receiving Settled Effluent from Trickling Filter No. 615.—Flooded Every Third Day at Same Rate as Sand Filter No. 618							
25	.31	.38	–	68	31.8	.166	3.5

CHARACTER OF THE SEWAGE USED FOR THE INVESTIGATIONS UPON SEWAGE PURIFICATION AT THE LAWRENCE EXPERIMENT STATION

The sewage for the various filters is pumped from the Osgood Street sewer to the Experiment Station through about 1,850 feet of pipe. It is a fairly strong domestic sewage free from trade wastes, with the coarser suspended matter excluded by a strainer on the end of the pipe in the sewer.

The following tables present the average analyses of sewage used during the year 1934. "Regular sewage" is the sewage as pumped to the Station; "settled sewage" is the same sewage after passing through Imhoff Tank No. 545 and receiving a slight additional settling in a large tank used for supplying all the filters at the Station, except Nos. 1, 4 and 9A which receive the effluent of Imhoff Tank No. 545.

IMHOFF TANK

One Imhoff Tank was operated during the year. It is of concrete, 20 feet deep, with a settling compartment 7 feet 4 inches long by 1 foot wide and has gas vents 1 foot square at each end. The bottom of the settling compartment has a slope of 45 degrees toward the center where there is a slot opening. The digestion compartment has a capacity of 357 gallons; the settling compartment, 715 gallons, giving a theoretical storage of about one and one-half hours during the seven to eight hours that the sewage is being pumped. Settleable solids were removed during the year at the rate of 691 pounds of dry matter per million gallons of sewage. The digested sludge as drawn was usually entirely inoffensive, black in color, contained an average of 3.2 per cent dry matter and had a pH of around 7.0. On one or two occasions, the sludge drawn seemed to be hardly digested at all and this may have been due to fresh sludge settling into a depression left in the old sludge at the previous drawing. The average composition of the dry sludge drawn was,—fats, 15 per cent; nitrogen, 3.92 per cent; loss on ignition, 71.1 per cent. One hundred and thirty-eight pounds of dry matter, including some from the gas vents, were withdrawn and 793 pounds were added. This tank would undoubtedly digest a larger amount of fresh solids if they were available. The tank has given no trouble during the year from foaming or acid conditions.

Average Analyses
(Parts per Million)

AMMONIA			KJELDAHL NITROGEN		Chlorine	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter 4 Days–20°C.
	ALBUMINOID							
Free	Total	In Solution	Total	In Solution				
Regular Sewage								
35.3	12.1	6.7	22.0	12.4	58	79.7	55	2,200,000
Sewage After Passing Through Imhoff Tank No. 545								
40.1	7.7	5.5	14.2	10.6	52	41.7	32	1,780,000
Settled Sewage								
43.0	6.6	4.3	11.7	8.2	55	36.1	32	2,090,000

Average Solids

(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Regular Sewage								
705	458	247	519	325	194	186	133	53
Sewage after Passing Through Imhoff Tank No. 545								
524	302	222	421	234	187	103	68	35
Settled Sewage								
473	251	222	374	180	194	99	71	28

OPERATION OF HOUSEHOLD SEPTIC TANKS

Two small concrete septic tanks, Nos. 507 and 508, have been operated at the Experiment Station since June, 1920. Tank No. 507 is 4 feet long, 2 feet wide and 40 inches deep, with a sloping bottom and has a capacity of 185 gallons. Tank No. 508 contains two compartments of the same size as the first and has a capacity of 370 gallons. Sewage enters each tank through trapped inlets and discharges through a pipe reaching 15 inches below the surface of the sewage in the tank. A baffle, located one-third of the distance from the inlet to the outlet, reaches to within 8 inches of the bottom of the tank. Tank No. 507 receives practically fresh household sewage and Tank No. 508 receives Lawrence sewage, which is comparatively stale. Both tanks are so operated that theoretically the sewage is held within each for two days; that is, the amount of sewage added daily is equal to one-half the capacity of the tanks, disregarding the effect of the accumulated sludge. During a large part of the period of operation, the effluents from both tanks have been remarkably clear and comparatively odorless. Besides settling out suspended solids, these tanks have effected a considerable reduction of soluble albuminoid ammonia.

In December, the tanks were opened for sludge measurements and analysis. Tank No. 507 was 77.5 per cent filled with sludge, an increase of 7.5 per centi n two years. The first compartment of Tank No. 508 was 75 per cent filled, an increase of 5 per cent; and the last compartment, 47.5 per cent filled, an increase of 12.5 per cent. Of the suspended organic solids deposited in Tank No. 507, from August, 1927, to December, 1934, 88 per cent had been destroyed, and in Tank No. 508, 75 per cent. Dry sludge from Tank No. 507 contained 3.0 per cent nitrogen, 3.7 per cent fats and 55 per cent loss on ignition. Dry sludge from Tank No. 508 contained 2.71 per cent nitrogen, 4.6 per cent fats and 48 per cent loss on ignition.

Average Analyses

(Parts per Million)

AMMONIA			KJELDAHL NITROGEN		Chlorine	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter 4 Days-20°C
Free	ALBUMINOID		Total	In Solution				
	Total	In Solution						
Fresh Sewage applied to Closed Septic Tank No. 507								
130.0	23.0	11.0	41.0	20.6	97	114.0	196	3,000,000
Effluent from Closed Septic Tank No. 507								
101.5	8.2	5.3	14.9	9.8	79	46.8	23	1,225,000
Regular Sewage applied to Closed Septic Tank No. 508								
41.3	10.8	6.2	19.6	11.5	61	60.3	55	1,525,000
Effluent from Closed Septic Tank No. 508								
54.5	4.3	2.9	7.8	5.1	62	24.5	15	2,100,000

Average Solids

(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Fresh Sewage applied to Closed Septic Tank No. 507								
1022	703	319	547	281	266	475	422	53
Effluent from Closed Septic Tank No. 507								
541	267	274	437	189	248	104	78	26
Regular Sewage applied to Closed Septic Tank No. 508								
647	392	255	434	231	203	213	161	52
Effluent from Closed Septic Tank No. 508								
409	180	229	348	142	206	61	38	23

ACTIVATED SLUDGE

Tank No. 485 operated with Compressed Air.—Tank No. 590 by Agitation

Experiments on the aeration of sewage have been carried on at the Lawrence Experiment Station continuously since 1911, and descriptions and results of this work have been published in the annual reports of the Department. Activated sludge Tank No. 485 which was started in 1917, is still in operation and has three compartments 75 inches deep, each holding 230 gallons. The overflow from the last compartment, comprising the purified sewage and considerable sludge, passes through two settling tanks with capacities of 600 and 160 gallons, respectively, allowing about five and one-half hours' sedimentation during which the activated sludge settles out and is then pumped back to the first compartment. Air is applied at the bottom of each compartment through a filtros plate, clamped to the top of an iron box, at a rate approximating .33 cubic feet of air per hour per gallon of sewage. The tank is operated at the rate of 7,433,000 gallons per acre daily on the basis of the aerating tanks and settling tanks, or 13,150,000 gallons on the basis of the aerating tanks alone. Late in the year, the rate was increased about 14 per cent. The amount of sludge retained in the tank was considerably less than the 20 per cent by volume formerly used. Excess sludge, equivalent to 146 pounds per million gallons of sewage treated, was pumped to waste. This sludge contained, on a dry basis, 6.73 per cent nitrogen and 4.1 per cent fats.

In all the various aeration tanks at the Experiment Station until 1931, aeration had been obtained by compressed air but at a number of places in this country and abroad, aeration by mechanical means has been carried on successfully. There is yet no agreement as to which method of aeration is more efficient and economical. In 1931 a small tank was put in operation at the Station to study mechanical aeration. This tank, No. 590, is of concrete, of an effective depth of 7 feet 9 inches and is 3 feet by 4 feet at the top, but one side slopes at such an angle 15 inches from the top that the tank is only 4 feet by 6 inches at the bottom. Built on one side of the tank at the top is a circular compartment or trough of 6-inch radius, in which a close-fitting paddle revolves at 60 revolutions a minute. A slot, 2 inches wide and 4 feet long, is built in the side of the tank and connects the bottom of the tank with the bottom of the trough. When the paddle is revolved, the sewage in the trough is thrown over a low dividing wall into the main tank and is well distributed over the surface. As the liquid is thrown from the trough, more comes up from the bottom of the tank through the slot and circulation of the mixture of sewage and sludge is continuous. Tank No. 590 is operated at the same rate as Tank No. 485 and has a similar arrangement of settling tanks and sludge return. The settled effluent of each has contained an average of 5.7 parts per million of dissolved oxygen and has been similar in appearance, clear and bright, with a very small amount of suspended matter. Chemical analyses of their effluents are similar, although the effluent of Tank No. 485 is of very slightly better quality. No reliable power costs can be obtained from such small-scale experiments.

Average Analyses

(Parts per Million)

Appearance		Ammonia			Kjeldahl Nitrogen			Nitrogen as—			
			Albuminoid								
Turbidity	Color	Free	Total	In Solution	Total	In Solution	Chlorine	Nitrates	Nitrites	Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20° C.
Sewage applied to Activated Sludge Tank No. 485 and Mechanically Aerated Activated Sludge Tank No. 590											
–	–	43.8	7.9	4.5	13.9	8.5	58	–	–	38.0	2,090,000
Effluent from Activated Sludge Tank No. 485											
3	47	9.5	1.6	1.0	2.9	1.9	56	12.0	.404	11.2	148,000
Effluent from Mechanically Aerated Activated Sludge Tank No. 590											
3	49	9.2	1.8	1.2	3.1	2.1	58	9.7	.508	11.1	263,000

Average Solids

(Parts per Million)

Unfiltered			Filtered			In Suspension		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Sewage applied to Activated Sludge Tank No. 485 and Mechanically Aerated Activated Sludge Tank No. 590								
483	250	233	364	163	201	119	87	32
Effluent from Activated Sludge Tank No. 485								
356	134	222	336	122	214	20	12	8
Effluent from Mechanically Aerated Activated Sludge Tank No. 590								
340	142	198	321	129	192	19	13	6

TRICKLING FILTERS

In 1890, an intermittent filter of coarse gravel was operated at the Experiment Station. This was the forerunner of the present trickling filter, and was probably the first filter of this type anywhere. Since then, there always has been a number of these filters in operation at the Experiment Station for the study of various problems in connection with their use.

The oldest, No. 135, has been in operation thirty-five years and is constructed of 10 feet in depth of walnut-size crushed stone. This size stone has been found to be rather small. While this filter has given a very good effluent, there has been a tendency toward clogging of the upper portion.

Four other filters, Nos. 452 to 455, inclusive, contain 4, 6, 8, and 10 feet in depth, respectively, of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. They were operated to show the greater efficiency of deeper filters, and their effluents have been of approximately the same quality. For each foot in depth of material, they have filtered 199,000, 265,000, 373,000, and 393,000 gallons of sewage per acre daily, respectively. Filter No. 475 contains 10 feet in depth of stone passing a 2½-inch screen and retained by a 1½-inch screen.

Filters Nos. 571, 572, and 573 are identical in construction, being 1/20,000 of an acre in area and containing 10 feet in depth of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. During 1934 the average rate of operation was 1,437,000 gallons per acre daily. At depths of 4, 6, and 8 feet, half-round sections of ¾-inch iron pipe are inserted to the center of the filters to collect small portions of the liquid passing through the filter. During 1934, samples were collected at different depths from Filter No. 571 only. The results of the analyses show progressive purification down through the filter.

The three filters have been operated mainly to study the value of chlorination and aeration as preliminary treatments of the sewage applied to the filters. Filter

No. 571 was used as a control. The sewage applied to No. 572 received 10 parts per million available chlorine from hypochlorite. The sewage was allowed to stand until the chlorine was used up before being applied to the filter. The sewage applied to Filter No. 573 contained an average of 5.7 parts per million of dissolved oxygen.

The results of three years' operation show no benefit from the use of chlorine. The effluent from Filter No. 572 is of very slightly poorer quality than that of control Filter No. 571. Filter No. 573, receiving the aerated sewage, gave an effluent of consistently better quality than the other two filters. Aerating the applied sewage relieves the filter of part of its burden. In the other two filters, a portion of the upper material is used for aerating the sewage, which has to be done before active purification can begin.

Average Analyses

Effluents from Trickling Filters Nos. 135, 452, 453, 454, 455, and 475.

(Parts per Million)

Filter Number	Quantity Applied — Gallons per Acre Daily	Ammonia			Kjeldahl Nitrogen	Chlorine	Nitrogen as —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20°C
		Free	Albuminoid				Nitrates	Nitrites		
			Total	In Solution						
135	1,475,000	16.5	3.7	2.1	6.4	65	16.0	.143	23.5	397,000
452	795,000	16.1	5.0	2.8	8.5	57	16.6	.180	27.1	480,000
453	1,590,000	25.8	5.0	2.6	8.5	57	8.2	.793	25.7	320,000
454	2,981,000	20.3	4.0	2.4	7.6	56	17.2	.205	23.5	600,000
455	3,934,000	20.4	4.3	2.4	7.7	57	10.8	.188	27.9	370,000
475	2,960,000	22.8	4.9	2.8	9.2	57	9.2	.245	29.4	620,000

Average Solids

Effluents from Trickling Filters Nos. 135, 452, 453, 454, 455, 475, 571, 572 and 573.

(Parts per Million)

Filter Number	Unfiltered			Filtered			In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
135	473	225	248	381	175	206	92	50	42
452	523	265	258	420	204	216	103	61	42
453	433	187	246	319	132	187	114	55	59
454	434	212	222	366	173	193	68	39	29
455	434	210	224	337	152	185	97	58	39
475	474	209	265	345	146	199	129	63	66
571*	532	270	262	416	199	217	116	71	45
572*	574	290	284	447	215	232	127	75	52
573*	551	280	271	443	219	224	108	61	47

*10-foot effluent.

Average Analyses of Effluents from Trickling Filters collected at Different Depths

(Parts per Million)

Depth (Feet)	Ammonia			Kjeldahl Nitrogen	Chlorine	Nitrogen as —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20°C
	Free	Albuminoid				Nitrates	Nitrites		
		Total	In Solution						
			Filter No. 571						
4	30.1	5.5	3.7	10.2	58	5.8	.301	34.0	–
6	23.5	5.8	3.3	10.4	57	10.1	.467	31.8	–
8	22.3	5.2	2.7	9.4	56	15.3	.258	28.5	–
10	18.1	5.0	2.3	8.9	54	19.4	.291	27.6	475,000
			Filter No. 572						
10	19.4	4.6	2.4	8.6	71	21.6	.241	27.1	260,000
			Filter No. 573						
10	19.0	4.4	2.2	7.9	56	27.2	.263	25.5	140,000

OPERATION OF CONTACT FILTERS

Contact filters are practically obsolete, but one filter of this type (No. 175) is kept in operation as an example of this method of sewage purification. It was put in operation in 1901, is 1/20,000 of an acre in area and contains 39 inches in depth of coke passing a 1-inch screen and retained on a ¼-inch screen. During 1934 the filter was operated one five-hour cycle daily at a rate of 389,000 gallons per acre with sewage which had passed through an Imhoff tank and received a small amount of settling in a storage supply tank. It was allowed to rest one week six times during the year. Since 1901, it has been necessary to remove and wash the filtering material three times,—in 1911, in 1920, and late in 1934. At the end of the year, the open space had decreased 10 per cent.

Average Analyses

Effluent from Contact Filter No. 175

(Parts per Million)

QUANTITY APPLIED	AMMONIA			Kjeldahl Nitrogen	Chlorine	NITROGEN AS—		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20° C.
		ALBUMINOID							
Gallons per Acre Daily	Free	Total	In Solution			Nitrates	Nitrites		
389,000	14.9	3.3	2.2	6.1	56	3.1	.258	18.9	900,000

Average Solids

Effluent from Contact Filter No. 175

(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
367	159	208	317	131	186	50	28	22

INTERMITTENT SAND FILTERS

The first intermittent sand filter at the Experiment Station was started in 1887 and since then two hundred and three have been operated with sewage, besides many others with various kinds of trades wastes. Unlike the water filter, where it is undesirable, the presence of air in the interstices of the sand is absolutely necessary for successful operation. This means that the surface sand must be in such condition that part at least of the air in the sand can be displaced by the applied sewage. Unless the sand is unduly fine, so that the lower foot or so remains saturated with water and acts as a seal, some air will be pushed through the sand to the outlet by the applied sewage. As the sewage passes down into the filter, fresh air is drawn in after it. The necessity for changing the air in a filter is due to the fact that the oxygen of the air is more or less exhausted by the oxidation of carbonaceous matters to carbon dioxide and by the formation of nitrates.

If the surface sand to a depth of six inches or more becomes heavily impregnated with suspended matter strained from the sewage, a filter is likely to give a poor effluent and be unable to handle as much sewage as when the sand is clean. The organic matter, especially when wet, fills the open space of the sand and prevents free circulation of air. Experiments illustrating this will be described later.

In a certain sewage disposal area the underdrains were laid at such a level that for a considerable portion of the year water from a near-by river backed up into the filter to the depth of a foot or so. Experiments showing the effect of such conditions will be described later.

Studies of Overdosing

The correct method of operating an intermittent sand filter is to apply sewage every day in one dose as rapidly as practical so as to cover uniformly the whole surface of the filter. If the sewage is applied slowly at one or more points on the bed, the entire surface will not be covered, the air in the sand will not be changed, and those portions of the bed receiving the sewage will be operating as continuous instead of intermittent filters, all of which make for poor results.

The filter area every unit of which receives sewage every day is the exception rather than the rule. It is unfortunately the practice at many treatment works, for a number of reasons, to apply during a few hours an amount of sewage equivalent to what should be applied in many days' doses.

To show the effect of this improper method of flooding filters, a series of small filters has been operated at the Experiment Station. These filters contain 4 feet in depth of sand of an effective size of .25 millimeter. Filter No. 593 is operated as a control and flooded once daily; Filter No. 594 is flooded every two days; Filter No. 595, every three days; Filter No. 596, every four days; Filter No. 597, every five days; Filter No. 598, every six days; Filter No. 599, every seven days; but each filter receives an equal volume of sewage each week unless the surface becomes clogged. During the year 1933 each filter was raked as often as was necessary to enable it to take its dose of sewage. During the year 1934 the surface of control Filter, No. 593, was raked whenever necessary and the others were raked only at the same time. This was to show the effect of the method of flooding on the rate of filtration as well as the quality of the effluent. The only filter whose rate was seriously affected was No. 599, which is flooded every seventh day. Its rate was reduced 29.3 per cent below that of the control filter which was 63,700 gallons per acre daily. With the rest of the filters, the bulk of the sewage passed through in twenty-four hours or less. At most of the municipal areas, the size of the sand is not so well adapted for filtration as is the sand in this series of filters. It is believed that the ill effect of improper flooding on the filters of this series will become increasingly evident in time.

An examination of the analyses shows that with the exception of some individual determinations, the general quality, both chemical and bacterial, is progressively poorer as the intervals between floodings are increased.

Filter No. 600 is a duplicate of Filter No. 593, except that 25 per cent of the material consists of stone between 1 and 2 inches in diameter. This material resembles unscreened sand such as is used in some institution or municipal filters. In 1933, the effluent from Filter No. 600 was about equal to that of Filter No. 593 but during 1934 it was of considerably poorer quality.

Effect of a Water-seal at the Outlet of a Filter and of Dirty Sand

A small filter, No. 624, started December 11, 1933, containing 3½ feet in depth of sand of an effective size of .25 millimeter, was provided with a trapped outlet so that the lower seven inches of the filter was always filled with liquid. It received Lawrence sewage at a rate of 50,000 gallons per acre daily. The effluent was as good as that of a control filter, No. 591. The surface sand being relatively clean and of a suitable size, the applied sewage had no difficulty in forcing enough air to the surface of the filter to maintain aerobic conditions. This shows that a filter can be operated successfully even though the lower section is continually water-sealed, provided the sand is of suitable size and the surface layer not overloaded with organic matter. Another filter, No. 627, started March 28, shows what happens under similar conditions when the surface layer of sand is very dirty. This filter contained 5 feet in depth of sand representing a cross section through Filter No. 1. This latter filter had been in operation forty-six years and the upper foot of sand was quite dirty, containing an average of 705 parts per million of albuminoid ammonia. The sand below this depth was comparatively clean.

For the first six months the effluent of Filter No. 627 contained no nitrates, was high in color, free and albuminoid ammonia. During July, August, and September, the surface of the filter was covered about one-third of the time. The trap or water-seal was removed for about a month and the upper foot of sand thoroughly dug over. Since then, with the trap restored, the filter has handled its dose but has given an effluent rather high in free and albuminoid ammonia and low in nitrates.

Two more filters were operated to show the effect of dirty sand on the ordinary operation of filters. Filter No. 625, started in January, contained 5 feet in depth of clean sand taken from Filter No. 1 below the upper foot of dirty sand. No. 626, like No. 627, contained 5 feet in depth, representing a cross section of Filter No. 1. All of these filters received Lawrence sewage at a rate of 50,000 gallons per acre daily.

Filter No. 625 gave a very good effluent while that of No. 626 was high in color, free and albuminoid ammonia, and low in nitrates. These filters show very strikingly the bad effect of the layer of dirty sand on the surface of filters. An accumulation of organic matter in the upper portion of sand filters is unavoidable but if the filter is operated properly, the accumulation is very gradual. This, of course, indicates the advantage of very thorough settling of sewage before application to sand filters.

Filters Nos. 1, 4 and 9A

Filters Nos. 1, 4, and 9A are each 1/200 of an acre in area, and at the end of 1934, Filter No. 1 and Filter No. 4 had been operated forty-seven years and Filter No. 9A, forty-four years. For the past nine years, the sewage applied to them has passed through an Imhoff tank where some suspended solids have been removed. These three filters contain 5 feet in depth of sand of an effective size of .48, .04 and .17 millimeter, respectively, and during the year were operated at average rates of 48,700, 20,300 and 49,200 gallons per acre daily, respectively. The surfaces of Filters Nos. 1 and 9A are trenched and ridged late in the fall, while the surface of Filter No. 4 is permanently arranged in circular trenches, 14 inches wide, filled to a depth of 12 inches with coarse sand of an effective size of .48 millimeter. Sewage is applied to the trenches while grass is allowed to grow on the rest of the filter.

The surface of Filter No. 1 has not been scraped during the past forty-one years. The only surface treatment has consisted of raking and since 1904, ridging and trenching during the winter. In 1892 and 1893, due to the excessive rate of operation, it was found advisable to scrape off some of the clogged, dirty sand.

The operation of Filter No. 625, with all clean sand, and of Filter No. 626, with 4 feet of clean sand and 1 foot of dirty sand, indicated that Filter No. 1 would give better results if the 1 foot of dirty surface sand were removed. It was impossible to find sand of the same grade and it not being desirable to replace the dirty sand with sand of another grade, the filter was reduced in area and the clean sand from the abandoned portion used to replace the dirty sand on the remainder of the filter. This resulted in a somewhat better effluent but as yet not as good as was expected.

Depth of Intermittent Sand Filters

With all the intermittent sand filters that have been operated at the Experiment Station, there has been no direct comparison of the effectiveness of filters of different depths. There is no uniformity in the depth of sand of municipal and institution filtration areas. Where the existing soil is merely underdrained, the depth is not of much importance from a cost point of view; but where the sand has to be brought from a distance, the depth is an important consideration.

With this point in view, four filters have been operated at the Experiment Station for over a year at a rate of about 60,000 gallons per acre daily. They are Nos. 620, 621, 622 and 623, and contain 2, 3, 4, and 5 feet in depth, respectively, of sand of an effective size of .25 millimeter. Nitrification is nearly the same in all four. The amount of organic matter is somewhat lower in the effluents from the two deeper filters. If the 2-foot filter can maintain the same degree of purification over a period of years, it would indicate that this depth of sand would be sufficient in many places where effluents are discharged into relatively polluted streams.

Average Analyses

(Parts per Million)

Filter Number	TEMPERATURE (DEGREES F.)		AMMONIA		Chlorine	NITROGEN AS —		Oxygen Consumed	Alkalinity
	Applied	Effluent	Free	Albuminoid		Nitrates	Nitrites		
1	53	54	9.03	1.12	54	23.1	.608	8.4	25
4	53	56	.51	.27	48	26.8	.049	3.1	–5
9A	53	55	1.07	.34	42	23.4	.010	3.6	0

Average Analyses

(Parts per Million)

Filter Number	Color	Number of Days Between Flooding	Ammonia		Chlorine	Nitrogen as —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
593	16	1	1.05	.34	53	32.8	.081	2.5
594	18	2	2.02	.53	53	33.7	.313	4.3
595	15	3	1.48	.64	52	33.8	.085	7.0
596	24	4	1.24	.83	53	35.6	.294	5.3
597	27	5	1.27	1.06	51	28.6	.562	8.2
598	26	6	1.31	1.08	53	32.2	.311	8.6
599	51	7	4.88	1.20	55	47.8	.216	11.5
600	57	1	6.20	.48	52	28.3	.148	4.3

Average Analyses

(Parts per Million)

Filter Number	Depth (Feet)	Color	Ammonia		Chlorine	Nitrogen as —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
620	2	26	2.52	.74	52	31.7	.571	6.2
621	3	27	1.37	.53	52	30.6	.484	4.3
622	4	18	.58	.40	52	38.2	.547	3.0
623	5	11	1.51	.40	53	32.5	.543	3.0

Average Analyses

(Parts per Million)

Filter Number	Color	Ammonia		Chlorine	Nitrogen as —		Oxygen Consumed
		Free	Albuminoid		Nitrates	Nitrites	
624	9	.10	.18	59	28.2	.237	1.6
625	29	.39	.38	58	38.4	.861	4.1
626	171	2.75	1.23	56	16.8	1.300	13.8
627	995	41.30	5.27	60	10.6	.670	65.6

Average Bacterial Analyses

Filter Number	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 cc.
	4 Days 20°C.	24 Hours—37°C.		
		Total	Red	
1	313,600	11,100	7,760	422,000
4	10,100	170	30	400
9A	16,600	660	450	19,000
593	3,430	140	10	300
594	27,300	420	82	2,000
595	50,900	2,110	1,160	15,500
596	58,200	2,770	470	6,000
597	54,700	2,200	1,830	31,700
598	16,300	2,680	1,605	45,900
599	122,000	1,220	840	15,400
600	12,700	260	100	1,400
620	50,800	850	350	6,000
621	43,400	860	290	13,900
622	9,900	250	95	2,600
623	6,400	300	20	200
625	23,500	550	110	400
626	69,500	1,840	430	23,500
627	398,000	21,600	11,600	17,200

BIOCHEMICAL OXYGEN DEMAND OF RIVER WATER

The B.O.D. and dissolved oxygen of the Merrimack River were determined monthly from June to November, inclusive, at the same stations as during the five previous years. The B.O.D.'s at all stations above Lawrence were about the same as in other years. At the station just below Lawrence, the B.O.D. was much lower than in previous years and the effect of this was shown at all the stations below.

STATION	B.O.D. (Parts per Million)	Dissolved Oxygen Per Cent of Saturation
At Tyngsborough	2.6	79.4
Above Lowell	2.9	78.2
Below Lowell	3.0	76.1
Above Lawrence	2.2	71.6
Below Lawrence	11.0	62.4
Above Haverhill	3.7	86.3
At Groveland	4.1	72.1
Above Amesbury	3.1	78.9
Above Newburyport	3.4	74.1

PURIFICATION OF POLLUTED WATER BY STORAGE

The study of the effect of storage in water purification, begun in 1930, has been continued. Two covered concrete tanks, 16 feet in diameter and holding 3 feet 9 inches in depth of water, are used. A small door in each tank allows diffused light to enter during the warmer months but during the winter the doors are closed. The first tank is divided by concrete walls into three sectors, one about twice as large as the other two. The second tank is divided into four equal sectors. These seven compartments are connected in series, the inlet in each case being at the bottom and the outlet near the top. River water is passed into the first compartment continuously at such a rate that it is thirty days passing through the two tanks. During the year, there was no apparent reduction of color by storage, due probably to errors in sampling. Bacteria of the coli-aerogenes group were reduced 99.72 per cent, and of the 20°C. bacteria, 91.81 per cent was removed. Storage also removed all suspended matter and reduced the free, total and soluble albuminoid ammonia. A sand filter, No. 577, was operated at a rate of 2,500,000 gallons per acre daily with the stored water, and a duplicate filter, No. 576, was operated with river water such as entered the storage tank. Both of these filters contain 4 feet in depth of sand of an effective size of .25 millimeter. The low bacterial efficiency of the filter receiving the stored water is typical of the results when a water free from suspended or easily coagulable matter is filtered through a slow sand filter.

Average Chemical Analyses

(Parts per Million)

	Color	AMMONIA			Chlorine	NITROGEN AS —		Oxygen Consumed	Hardness
			ALBUMINOID						
		Free	Total	In Solution		Nitrates	Nitrites		
Filter No. 576:									
Raw river water applied to	45	.160	.183	.147	3.6	.243	.007	4.6	14
Effluent from	28	.041	.088	–	3.6	.356	.004	3.2	14
Filter No. 577:									
Stored river water applied to	46	.060	.137	.126	3.5	.389	.010	4.5	29*
Effluent from	38	.026	.110	–	3.5	.463	.002	3.9	29*

*Increased hardness due to use of concrete storage tanks.

Average Bacterial Analyses

	BACTERIA PER CUBIC CENTIMETER			Coli-Aerogenes Group in 100 cc.
	4 Days 20°C.	24 Hrs.—37°C.		
		Total	Red	
River water before storage	4,200	170	55	4,200
River water after 30 days' storage	345	15	0	8
Effluent from Filter No. 576	110	7	1	35
Effluent from Filter No. 577	80	9	0	2

LAWRENCE CITY FILTERS

As usual this report presents data in regard to the operation during the past year of the slow sand filters for the purification of the water supply of Lawrence. Lawrence has taken its water supply from the Merrimack River since 1875, and since 1893 it has been filtered. Since 1918, the filtered water has been treated with chlorine as an added factor of safety. Three filters are in use. The oldest, 2.2 acres in area, is divided into three sections, one of which is covered; the second, 0.75 of an acre in area, was built in 1907 and is covered; the third filter, also covered, was completed early in 1926 and is 0.75 of an acre in area. The average volume of water filtered during 1934 was 5,442,000 gallons per day. Liquid chlorine was applied as a solution at the pump-well at the average rate of 1.40 parts per million. This amount of chlorine is very high compared with what is used with other supplies but is no higher than has been found to be necessary to adequately treat the water of the Merrimack River. The chlorinated water is pumped direct to a storage reservoir holding about 41,500,000 gallons, from which the greater part of the city is supplied by the low service system. This arrangement allows a larger residual chlorine than if the water were pumped directly into the distribution system. No attempt is made to maintain any definite residual chlorine. Daily bacterial samples are collected of the water after chlorination and the amount of chlorine to be added is governed by the bacterial analyses. It is seldom necessary to change the rate of chlorination. In 1931 an electrically driven pump was installed to supply water for the high service system from the reservoir. The bacterial efficiency of the various filters has averaged better than 99 per cent but the B. coli index, or the number of bacteria of the coli-aerogenes group in 100 cubic centimeters, is still higher than now allowed by the U. S. Treasury standard. After chlorination, however, the average number is less than one. There has been some increase in the 20°C. bacteria count in the water of the storage reservoir, due partly to an "after growth" following chlorination and partly to contamination by dust. All the filters, except the west covered, are provided with Venturi meters. There are no provisions for collecting samples from the former. For some time the recordings of the meters have been open to grave doubts as to their accuracy.

Average Bacterial Analyses of Water collected in connection with the Lawrence City Filters

BACTERIA PER CUBIC CENTIMETER			PER CENT OF BACTERIA REMOVED			PER CENT OF SAMPLES CONTAINING COLI-AEROGENES GROUP IN					Coli-Aerogenes Group in 100 cc.
4 Days 20°C.	24 Hrs.–37°C.		4 Days 20°C.	24 Hrs.–37°C.		.001 cc.	.01 cc.	0.1 cc.	1.0 cc.	10 cc.	
	Total	Red		Total	Red						
Merrimack River — Intake of the Filters											
12,800	1,070	328	–	–	–	8	74	100	100	100	14,800
Effluent from the Lawrence City Filter (Old Filter, East Open Section)											
105	5	0	99.2	99.5	100.0	–	–	0	3	37	7
Effluent from the Lawrence City Filter (Old Filter, East Covered Section)											
190	7	1	98.5	99.3	99.7	–	–	0	19	49	23
Effluent from the Lawrence City Filter (Old Filter, West Open Section)											
95	6	1	99.3	99.4	99.7	–	–	0	12	43	14
Effluent from the Lawrence City Filter (North Filter)											
180	10	3	98.6	99.1	99.0	–	0	6	23	64	80
Mixed Effluents as pumped to the Distributing Reservoir after Chlorine Treatment											
12	2	0	99.9	99.8	100.0	–	–	0	0	0	–*
Water from the Outlet of the Distributing Reservoir											
210	41	1	98.3	96.2	99.7	–	–	0	0	5	–*
Water from a Tap at Lawrence City Hall											
190	2	0	98.5	99.8	100.0	–	–	0	0	2	–*
Water from a Tap at the Lawrence Experiment Station											
140	21	0	98.9	98.0	100.0	–	–	0	0	5	–*
Water from a Tap on the High Service System											
190	32	0	98.5	97.0	100.0	–	–	0	0	4	–*

*Less than 1.

Average Chemical Analyses of Water collected in connection with the Lawrence City Filters

(Parts per Million)

Temperature (Deg. F.)	APPEARANCE		AMMONIA			Chlorine	NITROGEN AS —		Oxygen Consumed	Iron	Hardness
				ALBUMINOID							
	Turbidity	Color	Free	Total	In Solution		Nitrates	Nitrites			
Merrimack River—Intake of the Filters											
50	3	46	.166	.251	.184	3.9	.208	.007	5.4	.55	15
Effluent from the Lawrence City Filter (Old East Filter)											
50	0	45	.181	.107	–	4.2	.327	.005	3.8	1.19	17
Effluent from the Lawrence City Filter (North Filter)											
50	0	32	.026	.108	–	4.1	.313	.004	3.9	.21	16
Water from the Outlet of the Distributing Reservoir											
50	0	39	.074	.107	–	5.5	.326	.003	3.8	.70	16
Water from a Tap at Lawrence City Hall											
53	0	36	.064	.104	–	5.6	.366	.002	3.7	.69	16
Water from a Tap at the Lawrence Experiment Station											
51	0	35	.042	.097	–	5.6	.344	.003	3.4	.74	16

Average Solids in Samples of Water collected in connection with the Lawrence City Filters

(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
Merrimack River—Intake of the Filters								
62.3	24.8	37.5	52.5	21.6	30.9	9.8	3.2	6.6
Effluent from the Lawrence City Filter (Old East Filter)								
55.0	20.3	34.7	–	–	–	–	–	–
Effluent from the Lawrence City Filter (North Filter)								
50.1	18.0	32.1	–	–	–	–	–	–
Water from the Outlet of the Distributing Reservoir								
54.2	20.4	33.8	–	–	–	–	–	–
Water from a Tap at Lawrence City Hall								
52.5	19.4	33.1	–	–	–	–	–	–
Water from a Tap at the Lawrence Experiment Station								
54.5	20.8	33.7	–	–	–	–	–	–

STUDIES OF LOSS OF HEAD AND MAXIMUM RATES OF FLOW OF WATER THROUGH FILTERS OF SAND AND OTHER MATERIALS

During the early work of the Experiment Station, many researches were made concerning the value, in either water or sewage filtration, of sands of various grades, peat, garden soil, and other material. Especial studies were made from time to time of the maximum rates of flow of water through these different materials and articles summarizing some of this work were published in the annual reports of the State Board of Health for 1892 and 1894. In the annual report of the Experiment Station for 1892, page 458, a table is given showing with other data the effective size of many of these materials and the maximum rate of flow of water through them. Recently, on account of certain questions now arising, considerable further work of this nature has been carried on, largely in regard to the relation between the depth of filter, the loss of head and the maximum rate of flow allowed by different materials.

For the first study, three filters, 10 inches in diameter and containing 10, 6 and 2 feet, respectively, in depth of sand of an effective size of .26 millimeter and a uniformity coefficient of 3.1, were put in operation. Two feet of clear water was maintained over each filter and the rate kept at 2,500,000 gallons per acre daily, the loss of head being read each day. The water used was tap water, practically free from suspended matter; hence any loss of head was due to air-binding in the filter. When the rate could no longer be maintained, the filters were slowly back-filled to expel air, and during thirty-one months of operation it was necessary to back-fill the 10-foot filter five times; the 6-foot, three times; and the 2-foot filter, four times. The average loss of head for each filter for thirty-one months was as follows: For the 10-foot filter, thirty-five inches; the 6-foot filter, thirty inches; for the 2-foot filter, fifteen inches.

For studies of the maximum rates of certain very fine materials, filters 10 inches in diameter and 4 feet deep were put in operation, two feet of clear water being maintained over the sand. The material of the first filter, No. 603, is hardpan, that is, clay mixed with coarser material, and its effective size is .04 millimeter and its uniformity coefficient, 4.9. The material of Filter No. 604 is river silt, the effective size of which is .05 millimeter and the uniformity coefficient, 2.6. The material of Filter No. 605 is a clayey gravel, somewhat similar to the material in Filter No. 603, except that there is a greater proportion of coarse material. The effective size of this material is .05 and its uniformity coefficient, 11.5. The material of Filter No. 606 is loam from a cultivated garden, with all roots and fibers screened out, and has an effective size of .04 millimeter and a uniformity coefficient of 6.2. These four materials, as will be noted, have nearly the same effective size but differ in uniformity coefficient, chemically and in other respects. The filters were operated with their outlets wide open and the rates read daily. The average monthly rates at four-month intervals are shown in the following table. Undoubtedly the shape of the particles, concerning which no information is given by the mechanical analyses, has much to do with the compacting or reduction of the open space of the material and increasing the resistance to the passage of water through the filters.

The wide variations in rates can only be explained by attributing them to variations in the amounts of air in the filters.

Average Rates

(Gallons per Acre Daily)

Months after Start	Filter No. 603 (Hardpan)	Filter No. 604 (River Silt)	Filter No. 605 (Clayey Gravel)	Filter No. 606 (Loam)
8	304,000	3,280,000	944,000	608,000
12	161,000	1,472,000	608,000	378,000
16	152,000	2,352,000	424,000	1,200,000
20	186,000	1,776,000	704,000	528,000
24	152,000	4,320,000	432,000	3,296,000
28	152,000	1,472,000	432,000	864,000
32	254,000	1,221,000	476,000	916,000
36	402,000	4,736,000	703,000	703,000
40	233,000	3,508,000	593,000	593,000

Taking Up of Iron During Passage of Water through Certain Materials

Outside of pollution, iron is one of the most undesirable constituents of a ground water supply. The amount to be expected cannot be predicted before a well is driven and, after a well is in operation, there is no certainty that the amount of iron will not increase. It is generally true that the iron will increase if the well is overworked.

The amount of iron in the water pumped depends on a number of factors, probably the most important of which is the chemical composition of the iron in the soil. It may be present as an integral part of the soil particles, combined with organic matter, or as an hydroxide precipitated about the soil particles. The dissolved oxygen, free carbon dioxide, and pH of the water passing through the soil also affect the amount of iron taken up. Organic matter may also have some effect by reducing the dissolved oxygen and increasing the carbon dioxide. In a general way, absence of dissolved oxygen and presence of free carbon dioxide tend to increase the extraction of iron from soil.

Early in the summer some test wells were being driven in Georgetown, the water from which was comparatively high in iron. It was decided to make the laboratory tests with material washed out during the driving of these wells. The wells were driven to varying depths, averaging around 30 feet. An average sample of material from the upper section had an effective size of .05 millimeter and a uniformity coefficient of 4.7, and a sample of the lower had an effective size of .13 millimeter and a uniformity coefficient of 9.1.

Three filters, 12 feet deep, were constructed of 4-inch akron pipe set in concrete bases and with cemented joints. On account of the depth of these filters, it was found necessary, in order to make them water-tight, to encase them in concrete. Filter No. 628 contained 6 feet 4 inches of the coarser sand and over this, 4 feet of the finer sand from Georgetown. Filter No. 629 contained the same depths of sand with the addition of a top layer of 1½ feet of peat such as is found above most of the Georgetown wells. The third filter, No. 633, contained 10 feet in depth of bank sand from Lawrence with an effective size of .32 and a uniformity coefficient of 2.7.

Acid soluble iron in the sand was determined by digesting with strong hydrochloric acid several hours on the water bath. In order to get the total iron, it would be necessary to grind the sand to an impalpable powder and fuse with sodium carbonate to break up the silicates. It is doubtful if the total iron would have been of any more value because it is the acid soluble iron that would be acted upon by water. Albuminoid ammonia was also determined as a measure of the organic matter. Loss on ignition would have been a better way of determining this if it were not for the fact that the sands would lose several times as much chemically combined water as there was organic matter. Results of analyses are shown in the following table:

	Ferric Oxide (Per Cent)	Albuminoid Ammonia (Parts per Million)
Fine sand from Georgetown	1.20	8.0
Coarse sand from Georgetown	2.16	–
Bank sand from Lawrence	1.12	10.0

During the process of driving these wells, the sand was forced up and out of the casing by a stream of water. During this operation much fine, reddish material, probably ferric oxide, was lost, so that the sand used in Filters Nos. 628 and 629 contained much less iron than the soil in which the wells were driven. The Lawrence sand in Filter No. 633 did not contain this fine material. The Georgetown sand is much finer than that from Lawrence and so has more surface exposed to the action of water. The organic matter in the two is about the same.

The three filters were kept full of ordinary distilled water which contained an average of 3.0 parts per million of free carbon dioxide and 5.4 parts per million of dissolved oxygen. No attempt was made to operate them continuously; instead enough water was drawn from each, once a day, to allow a theoretical 15-day contact between the water and sand. It was intended to imitate to some extent the action of ground water rather than the ordinary filtration. Results, averaged by months, are shown in the following table:

Average Analyses of Effluents of Filters containing Georgetown Sand or Lawrence Sand

(Parts per Million)

	Filter No. 628 with Coarse and Fine Sand from Georgetown				Filter No. 629 with Coarse and Fine Sand and Peat from Georgetown				Filter No. 633 with Lawrence Sand		
MONTH	Color	Iron	Carbon Dioxide	Dissolved Oxygen	Color	Iron	Carbon Dioxide	Dissolved Oxygen	Color	Iron	Dissolved Oxygen
Jume	16	.50	–	0.8	16	.39	–	0.8	–	–	–
July	43	2.12	4	0.5	35	1.46	4	0.7	–	–	–
August . . .	29	1.17	3	0.7	27	1.02	4	0.7	11	.05	3.5
September . . .	23	.66	7	0.7	21	.64	6	0.7	6	.15	5.0
October . . .	15	.33	2	0.7	18	.46	2	0.7	5	.20	8.8
November . . .	17	.31	3	1.3	26	.78	3	1.3	2	.14	9.0
December . . .	16	.37	–	0.6	36	.75	–	0.6	2	.11	9.5

The concrete bases of the filters, even after seven months' operation, continued to give off caustic alkalinity. Carbon dioxide determinations were made on the last portion of the effluent drawn, but are not reliable, being probably too low.

There was an average reduction of dissolved oxygen of at least 4.6 parts per million in the water passing through Filters Nos. 628 and 629, while in Filter No. 633, there was an increase. The dissolved oxygen of the applied distilled water was determined before it was applied to the filter, and as the water stood on top of the filter, it took on more dissolved oxygen. It is not certain what absorbed the dissolved oxygen in Filters Nos. 628 and 629. It seems as though it must have been absorbed by organic matter and converted to carbon dioxide, but this cannot be checked because of the caustic alkalinity from the base of the filter. Another explanation would be that it might have been absorbed by ferrous iron in the sand. The presence of the layer of peat in Filter No. 629 apparently had no effect, as the dissolved oxygen was no lower than in Filter No. 628.

In both filters, the color and iron reached a maximum after two months. After four months, these became fairly constant in Filter No. 628. In Filter No. 629, there was a slight upward tendency after five months. The effluent of Filter No. 633 contained comparatively little iron or color and usually had no turbidity, or at the most, only a slight amount. The effluents from Filters Nos. 628 and 629 were quite turbid, resembling the water from the test wells after standing.

These experiments show that distilled water can remain in contact for fifteen days with some sands without taking up appreciable amounts of iron, while with other sands, the amount of iron taken up unfits the water for use unless the iron is removed. These tests were made under aerobic conditions and with a water low in carbon dioxide, resembling rain water. The tests are to be repeated with water containing dissolved oxygen and increased amounts of carbon dioxide, and with water free from dissolved oxygen.

The cause of the different action of the two sands can only be surmised, but it seems probable that the Georgetown sands contained hydroxides of iron that were more readily acted on than is the iron in the Lawrence sand.

Ripening of Water Filters

Before a sand filter can do effective work, it must become "ripened." This process requires a number of weeks, the time depending on temperature and the nature of the water filtered. The more organic matter the water contains, the quicker the ripening. The sand grains of a ripened filter are covered with a thin film of gelatinous material, derived from the water, and consisting of both dead and living matter. This film is heaviest in the upper portion of the sand, but extends to some depth. There are times when it would be desirable to hasten the ripening of a filter. So far as known, there is no way of doing this.

To study this, three filters, 10 inches in diameter and containing 5 feet in depth of sand of an effective size of .32 millimeter, were started at the Experiment Station. The first was run as a control. On the surface of the second, a thin mat of aluminum hydroxide was formed by precipitating alum, at the rate of 1,850 pounds per acre, with a slight excess of soda ash. The third was loaded with aluminum hydroxide by mixing sufficient magnesium oxide in the sand to precipitate sixty-five tons per acre of alum. All three filters received Merrimack River water at the rate of 2,500,000 gallons per acre daily. They were started in June when the water was warm, and all three behaved abnormally. Instead of having large numbers of bacteria of the coli-aerogenes group in the effluents for some time, practically as soon as started the effluents of all three had a B.coli index as low as, or lower than, the Lawrence city filters. The 4-day 20°C. counts were considerably higher, however. There was no significant difference between the results of the experiments on the three filters.

REPORT OF DIVISION OF TUBERCULOSIS

ALTON S. POPE, M.D., *Director*
LOUIS N. PHANEUF, *Assistant Director*
DAVID ZACKS, M.D., *Chief of Clinics*

I have the honor to submit the fifteenth annual report of the Division of Tuberculosis. This report includes an outline of the principal activities of the Division, the annual reports of the four State Sanatoria and the Pondville Cancer Hospital, for the fiscal year ending November 30, 1934, together with certain developments in tuberculosis control in the State at large.

It is gratifying to note that in spite of the continued economic stringency and unemployment the usual reduction of some 200 deaths from tuberculosis was maintained in 1934. For the first time deaths from pulmonary tuberculosis in the Commonwealth fell below the two thousand mark, and the death rate from tuberculosis, all forms, below 50 per 100,000. At the same time a slight increase in total cases reported suggests that the general improvement in diagnostic facilities throughout the State is beginning to stimulate earlier case finding.

TUBERCULOSIS DEATHS AND DEATH RATES PER 100,000
Massachusetts 1925–1934

YEAR	PULMONARY		OTHER FORMS		TOTAL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1925	2,883	69.3	576	13.9	3,459	83.4
1926	2,961	71.0	555	13.3	3,516	84.3
1927	2,774	66.2	429	10.2	3,203	76.4
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.[illegible]	248	5.8	2,554	59.7
1932	2,041	47[illegible]	261	6.1	2,302	53.5
1933	2,058	47[illegible]	222	5.1	2,280	52.8
1934	1,902	43.8	214	4.9	2,116	48.7

STATE SANATORIA

During the year the four State Sanatoria have furnished 416,372 days of treatment for 2,119 patients. Of these [illegible] 1,142 were in the institutions at the beginning of the year and 977 repres[illegible] admissions. The cases were divided as follows: Rutland, 755 cases of pu[illegible]rculosis; North Reading and Westfield, 889 children with adult or child[illegible] of the disease; Lakeville, 475 patients with extra-pulmonary forms of tub[illegible]. Thirty-seven less patients were treated than last year and 1,784 less days of treatment were provided. This slight decrease is explained by the unwillingness of certain towns to hospitalize diagnosed cases of childhood tuberculosis, and the increasing emphasis laid by the Department upon the discovery of the adult type of tuberculosis in adolescents.

On account of the gradual rise in commodity prices the weekly per capita costs at the State Sanatoria have averaged slightly higher than last year. At Rutland the gross cost was $14.89; at North Reading $16.30; at Westfield $18.04; and at Lakeville $17.42. The excess in per capita costs at Westfield is due to a decreased average population together with additions to the staff on account of the take-over of school clinic work in the western part of the State.

The increasing use by physicians and boards of health of the diagnostic facilities of our State Sanatoria has been one of the most gratifying features of the year's work. Through their out-patient departments and consultation clinics the four Sanatoria examined 5,640 patients in 1934; an increase of 276 examinations over the previous year.

The important role which thoracic surgery now plays in the treatment of pulmonary tuberculosis has made it necessary to provide for this essential service on a more permanent basis. Through the interest and efforts of Dr. Churchill, our surgical consultant, we have been able to secure phrenic nerve surgery at the sanatoria and to transfer patients needing thoracoplasty to the Massachusetts General Hospital. In such cases the board of health has paid the hospital at the same rate it had been paying the sanatorium. As this involves a loss to the hospital of approximately three dollars a day for each patient admitted and the present ward facilities are not sufficient to insure prompt admission of the sanatorium cases, it has become necessary to make a more comprehensive plan for providing major thoracic surgery for our patients. A tentative arrangement has been worked out with the hospital by which a sufficient number of beds will be made available for sanatorium patients at ward rates, plus a very modest fee for the surgeon, and the Department is asking for an appropriation sufficient to meet the anticipated charges under such an arrangement.

In order to relieve the long waiting list at Middlesex County Sanatorium, and to make tuberculosis beds in State Sanatoria more freely available to patients in all parts of the Commonwealth, the statute fixing the rate at Rutland was amended by the 1934 Legislature to permit a charge to cities and towns of less than the actual cost of maintenance. A rate of $10.50 per week was subsequently set by the Department. This has made it possible to admit promptly a considerable number of patients urgently in need of treatment, both from Middlesex County and other parts of the State.

For some years it has been obvious that more adequate facilities would have to be provided for the treatment of tuberculosis in the western part of the State. The institutions now serving that territory have neither the capacity nor the equipment necessary for the modern treatment of tuberculosis, and as a result patients are reluctant to accept hospitalization, to their own detriment and to that of their communities. To meet this need the Commissioner of Public Health has recommended the construction of a 250-bed unit for adult patients with pulmonary tuberculosis on the grounds of the Westfield State Sanatorium. By utilizing the existing facilities a sanatorium could be constructed on that site at a minimum cost and would be very accessible to the territory served. Such an institution, by replacing the present inadequate sanatoria in Springfield, Holyoke and Chicopee, and the Hampshire County Sanatorium at Haydenville, would permanently solve the sanatorium problem in the four western counties of the State. It is proposed that this sanatorium be constructed and operated by the State on the same basis as the three district sanatoria now under construction in New York State.

Pondville Cancer Hospital

Through the Emergency Public Works Commission funds have been made available for a much-needed service and surgical building and a 25-bed wing at Pondville. The contracts were let July 11, 1934, and there is every prospect that the new buildings will be ready for occupancy by August, 1935. Besides furnishing a thoroughly modern operating unit, increasing the capacity of the hospital and relieving the present congestion in the out-patient department, the new buildings will provide a convenient, well equipped service unit that is essential to the efficient operation of every hospital.

Although there has been a continued growth in all services at Pondville during the year, it is evident that additional service to cancer patients must wait for the completion of the new buildings now under construction. There were 1,222 admissions, 19 more than last year, and the out-patient visits rose to a new total of 4,619. The average length of hospitalization was further reduced from 37.1 to 33.8 days in an attempt to shorten the waiting list for admission, but we believe that any further reduction in the average period of hospital treatment of cancer patients is not desirable from the standpoint of the patient.

The increase in all branches of medical work has necessitated the addition of one physician and three nurses to the resident staff. Operations increased 14 per cent and autopsies 12 per cent during the year.

The vacancy caused by the resignation of Dr. George M. Sullivan after four years of outstanding service as Superintendent has been filled by the appointment of Dr. George L. Parker, Assistant Superintendent of the Wrentham State School. Dr. Parker was previously Assistant Superintendent of the Lakeville State Sanatorium and comes to Pondville well qualified by his institutional experience.

The opening of the new service building and ward will seriously complicate the present crowded housing conditions at Pondville. The need for additional employees' quarters was recognized by the engineers of the Emergency Planning Board, who recommended a separate dormitory building rather than living quarters in the service building. A request for a 100-bed dormitory has accordingly been included in the 1935 budget.

COUNTY SANATORIA

The Middlesex County Sanatorium is still faced with a waiting list which in part nullifies its excellent work in case finding. Since a request for authorization to raise funds for a 150-bed addition was refused by the 1934 Legislature it is hoped that Middlesex County towns will further avail themselves of the new rates at Rutland to reduce the waste of time and human life incidental to delay in the hospitalization of tuberculosis.

The quality of medical service in the county institutions has shown steady improvement. The proportion of patients receiving pneumothorax has increased appreciably, and in the county and state sanatoria 55 per cent received some form of collapse therapy in 1934. All of the sanatoria now also have some regular affiliation for thoracic surgery. The extension of diagnostic work through out-patient departments and consultation clinics in adjoining towns has been very gratifying and may well be responsible for the increased ratio of reported cases to deaths during the year.

SOCIAL SERVICE

The social workers have continued to give service to sanatorium patients referred by the superintendents and others, and in the case of every child admitted, to study the home situation. This is done as soon as possible after the children's admission, and social action when indicated is thus initiated promptly.

Because of the relationship between tuberculosis and social and economic conditions, social service could be effective in a large proportion of the tuberculous families and the actual need for this service continued to be greater than we can meet adequately—in spite of the addition of the third worker last year.

The social problems dealt with are as varied as ever, but the outstanding one is inadequacy of income for proper nourishment, clothing, and medical care for the family.

The general economic situation makes it difficult for many patients to make an occupational adjustment after discharge. In a number of such cases it has been possible for the social workers to make a suitable plan in another state where the patient has relatives or friends, and to arrange for transportation.

Consultation service has been carried on regularly in the Nashoba and Southern Berkshire areas and is increasing in volume. The social workers are also frequently called upon for consultation service by individuals in the communities they visit. The monthly staff conferences have been attended regularly at each of the sanatoria, and have been very helpful in the adjustment of patients' social problems.

During 1934 the workers made 1,926 home visits. Medical and social agents were contacted 2,588 times and 172 different cities and towns were visited.

THE SCHOOL CLINIC PROGRAM

Decentralization of the school clinic program has begun very satisfactorily. Most of the county sanatoria have started or are arranging to start examinations soon, and some of the larger cities have already begun. The state sanatoria are dividing the work with the counties according to geographical location and the three western counties without sanatoria are being covered by Westfield. Children already on the lists of the Chadwick Clinic are being followed and re-examined annually by the state clinic group, which is also assisting some of the county and municipal sanatoria in organizing their clinic work. By another year it would appear that adequate service on this basis will be available throughout the State.

With the completion of the Ten Year Program in Massachusetts, it seems fitting to submit a complete summary of the work done and some estimate of the results accomplished. This is by far the largest tuberculosis case-finding project in children yet undertaken, and while it will be some years before the end results can be accurately appraised, some accounting to the public is certainly warranted.

For purposes of comparison the following summary of the tenth year's work of the Chadwick Clinics is submitted:

SUMMARY OF TENTH YEAR OF CHADWICK CLINICS
1933–1934

Total school population of towns visited	103,956
Number given Von Pirquet test	66,878
Number of reactors	13,799
Number X-rayed	14,861
Number examined	2,797
Number diagnosed as pulmonary tuberculosis	16
Number diagnosed as pulmonary tuberculosis suspects	22
Number diagnosed as hilum tuberculosis	637
Number diagnosed as hilum tuberculosis suspects	576

A statistical summary of the ten years' work is given in the following tables. The first table represents examinations for the whole period but, because during the first five years of the program only selected groups in the schools were tested, the last five years results have been tabulated separately as more truly representative of the school population as a whole. This is followed by a less technical statement of findings and a table giving the incidence of tuberculosis in contacts and non-contacts.

In explanation it should be said that all tuberculin tests were made with the Pirquet technique, with a comparable grade of old tuberculin. Diagnosis of tuberculosis was based on roentgenological findings and practically all interpretations were made by one physician. Statistically, hilum (childhood type) and latent hilum cases should be combined, as childhood type of tuberculosis rarely gives symptoms or physical signs.

CHADWICK CLINIC RESULTS
Grand Totals
1924–1934

Enrollment of tested schools	991,113
Number given tuberculin (Von Pirquet) test	400,591
Per cent tested of school enrollment	40.0
Number of positive reactors to test	100,025
Per cent positive reactors of number tested	25.0
Number X-rayed	103,462
Number given physical examination	117,777
Number of adult type (pulmonary) cases found	261
Per cent adult type cases of number tested	0.065
	(1–1500)
Per cent adult type cases of positive reactors	0.261
	(1–380)
Number of childhood type (Hilum) cases found	5,620
Per cent childhood type cases of number tested	1.40
Per cent childhood type cases of positive reactors	5.62
Number of suspect cases found	12,323
Per cent suspect cases of number tested	3.08

Note: The ratios written in parentheses above and in the tables hereafter are convenient approximations only and are not intended to be as accurate as the percentage figures they follow.

GRADE AND HIGH SCHOOL GROUPS
1930–1934

	Grade	High	Total
Enrollment of tested schools	308,765	88,198	396,963
Number given tuberculin (Von Pirquet test)	201,725	49,925	251,650
Per cent tested of school enrollment	65.3	56.7	63.4
Number of positive reactors to test	42,016	18,640	60,656
Per cent positive reactors of number tested	20.8	37.3	24.1
Number X-rayed	43,580	18,875	62,455
Number given physical examination	11,143	3,057	14,200
Number of adult type (pulmonary) cases found	60	72	132
Per cent adult type cases of number tested	0.030	0.144	0.052
	(1–3300)	(1–690)	(1–1900)
Per cent adult type cases of positive reactors	0.143	0.386	0.218
	(1–700)	(1–260)	(1–460)
Number of childhood type (Hilum) cases found	2,104	580	2,684
Per cent childhood type cases of number tested	1.04	1.16	1.07
Per cent childhood type cases of positive reactors	5.01	3.11	4.43
Number of adult type suspect cases found	56	37	93
Per cent adult type suspect cases of number tested	0.028	0.074	0.037
	(1–3600)	(1–1400)	(1–2700)
Number of childhood type suspect cases found	4,765	1,020	5,785
Per cent childhood type suspect cases of number tested	2.36	2.04	2.30

Notes: The last four years' figures only were used in compiling this table since uniform methods of examining and recording for both grade and high schools were employed during that period alone.

In this table and those following in which childhood type (Hilum) cases and childhood type suspect cases are compared in the grade and high schools the figures given do not show the true incidence of such childhood type involvement in the high school. Early in the Clinics there was established the policy of placing varying importance upon similar X-rays in this childhood type group according to the age and the physical and social condition of the child. Thus, a grade school pupil with childhood type disease by X-ray was definitely reported as such, while a high school pupil with a similar X-ray but with a negative physical examination and good home conditions was not necessarily so classified. Therefore, the figures given here for this group indicate in the high school a part only of the childhood type of tuberculosis as shown by X-ray.

Contact and Non-Contact Groups
1932–1934

	Contact	Non-contact	Total
Number given tuberculin (Von Pirquet) test	2,305	116,818	119,123
Grade	1,827	90,469	92,296
High	478	26,349	26,827
Number of positive reactors to test	1,418	28,610	30,028
Grade	1,045	18,502	19,547
High	373	10,108	10,481
Per cent positive reactors of number tested	61.5	24.5	25.2
Grade	57.2	20.5	21.2
High	78.0	38.3	39.1
Number X-rayed	2,382	29,109	31,491
Grade	1,887	18,972	20,859
High	495	10,137	10,632
Number given physical examination	2,318	4,128	6,446
Grade	1,844	3,085	4,929
High	474	1,043	1,517
Number of adult type (pulmonary) cases found	16	26	42
Grade	4	9	13
High	12	17	29
Per cent adult type cases of number tested	0.694 (1–140)	0.022 (1–4500)	0.035 (1–2900)
Grade	0.219 (1–460)	0.010 (1–10,000)	0.014 (1–7100)
High	2.51	0.065 (1–1500)	0.108 (1–930)
Per cent adult type cases of positive reactors	1.13	0.091 (1–1100)	0.140 (1–710)
Grade	0.383 (1–260)	0.049 (1–2000)	0.066 (1–1500)
High	3.21	0.168 (1–600)	0.277 (1–360)
Number of childhood type (Hilum) cases found	290	948	1,238
Grade	242	699	941
High	48	249	297
Per cent childhood type cases of number tested	12.6	0.812 (1–120)	1.04
Grade	13.2	0.774 (1–130)	1.02
High	10.0	0.945 (1–110)	1.11
Per cent childhood type cases of positive reactors	20.4	3.31	4.12
Grade	23.2	3.78	4.81
High	12.9	2.46	2.83
Number of adult type suspect cases found	8	31	39
Grade	4	19	23
High	4	12	16
Per cent adult type suspect cases of number tested	0.347 (1–290)	0.027 (1–3700)	0.033 (1–3000)
Grade	0.219 (1–460)	0.021 (1–4800)	0.025 (1–4000)
High	0.836 (1–120)	0.046 (1–2200)	0.060 (1–1700)
Number of childhood type suspect cases found	351	1,509	1,860
Grade	296	1,185	1,481
High	55	324	379
Per cent childhood type suspect cases of number tested	15.2	1.29	1.56
Grade	16.2	1.31	1.60
High	11.5	1.23	1.41

Note: These figures are those obtained in the clinics for nine months of the 1932–1933 school year and for the full ten months of the 1933–1934 school year.

First Five Years

	1924–1925	1925–1926	1926–1927	1927–1928	1928–1929
Enrollment of tested schools	57,483	184,091	163,411	47,626	53,260
Number given tuberculin (Von Pirquet) test	10,016	18,601	19,194	26,052	25,699
Per cent tested of school enrollment	17.4	10.1	11.7	54.8	48.3
Number of positive reactors to test	2,927	5,314	5,188	7,219	7,423
Per cent positive reactors of number tested	29.2	28.5	27.0	27.7	28.9
Number X-rayed	3,008	5,730	5,803	7,670	7,519
Number given physical examination	10,648	19,073	19,527	26,177	25,693
Number of adult type (pulmonary) cases found	31	19	29	8	11
Per cent adult type cases of number tested	0.310 (1–320)	0.102 (1–980)	0.151 (1–660)	0.031 (1–3200)	0.043 (1–2300)
Per cent adult type cases of positive reactors	1.06	0.358 (1–280)	0.558 (1–180)	0.111 (1–900)	0.148 (1–680)
Number of childhood type (Hilum) cases found	561	621	524	376	415
Per cent childhood type cases of number tested	5.61	3.33	2.73	1.44	1.61
Per cent childhood type cases of positive reactors	19.1	11.7	10.1	5.21	5.59
Number of suspect cases found	1,114	1,399	1,112	896	848
Per cent suspect cases of number tested	11.1	7.53	5.79	3.44	3.30

Notes: The Clinics for the first five years tested grade school pupils only. In the first three years of the Clinics the cases examined were from three selected groups: known contacts, underweights, and suspects referred by local physicians and school nurses. During the remaining seven years all children without selection were tested. Likewise, early in the Clinics more stress was laid on physical examination as a diagnostic procedure than later. In these facts lies the explanation of the higher percentage of disease found and the relatively greater number of physical examinations done during the first three years.

LAST FIVE YEARS

	1929–1930	1930–1931	1931–1932	1932–1933	1933–1934
Enrollment of tested schools	88,279	99,472	101,455	92,080	103,956
Grade		81,509	80,695	69,321	77,240
High		17,963	20,760	22,759	26,716
Number given tuberculin (Von Pirquet) test	49,379	57,412	68,899	58,461	66,878
Grade		48,681	55,962	44,769	52,313
High		8,731	12,937	13,692	14,565
Per cent tested of school enrollment	56.0	57.8	68.0	63.5	64.3
Grade		59.7	69.4	64.7	67.8
High		48.6	62.3	60.2	54.5
Number of positive reactors to test	11,298	16,426	13,254	17,177	13,799
Grade		12,663	9,245	11,187	8,921
High		3,763	4,009	5,990	4,878
Per cent positive reactors of number tested	22.9	28.6	19.2	29.4	20.6
Grade		26.0	16.5	25.0	17.0
High		43.2	31.0	43.8	33.6
Number X-rayed	11,277	16,612	13,396	17,586	14,861
Grade		12,814	9,339	11,549	9,878
High		3,798	4,057	6,037	4,983
Number given physical examination	2,459	3,476	3,865	4,062	2,797
Grade		2,961	2,945	3,038	2,199
High		515	920	1,024	598
Number of adult type (pulmonary) cases found	31	33	55	22	22
Grade		14	32	7	7
High		19	23	15	15
Per cent adult type cases of number tested	0.063 (1–1600)	0.057 (1–1800)	0.080 (1–1200)	0.038 (1–2600)	0.033 (1–3000)
Grade		0.029 (1–3400)	0.057 (1–1800)	0.016 (1–6200)	0.013 (1–7700)
High		0.218 (1–460)	0.178 (1–560)	0.110 (1–910)	0.103 (1–970)
Per cent adult type cases of positive reactors	0.274 (1–360)	0.201 (1–500)	0.415 (1–240)	0.128 (1–780)	0.159 (1–630)
Grade		0.110 (1–910)	0.346 (1–290)	0.063 (1–1600)	0.078 (1–1300)
High		0.505 (1–200)	0.575 (1–170)	0.250 (1–400)	0.307 (1–330)
Number of childhood type (Hilum) cases found	439	625	750	672	637
Grade		512	602	494	496
High		113	148	178	141
Per cent childhood type cases of number tested	0.890 (1–110)	1.09	1.09	1.15	0.953 (1–100)
Grade		1.05	1.07	1.10	0.949 (1–110)
High		1.29	1.14	1.30	0.969 (1–100)
Per cent childhood type cases of positive reactors	3.89	3.80	5.66	3.91	4.61
Grade		4.04	6.51	4.42	5.56
High		3.01	3.69	2.97	2.89
Number of adult type suspect cases found	11	20	32	25	16
Grade		13	20	17	6
High		7	12	8	10
Per cent adult type suspect cases of number tested	0.022 (1–4500)	0.035 (1–2900)	0.046 (1–2200)	0.043 (1–2300)	0.024 (1–4200)
Grade		0.027 (1–3700)	0.036 (1–2800)	0.038 (1–2600)	0.011 (1–9100)
High		0.080 (1–1200)	0.093 (1–1100)	0.058 (1–1700)	0.069 (1–1400)
Number of childhood type suspect cases found	1,065	1,654	2,086	1,469	576
Grade		1,482	1,663	1,141	479
High		172	423	328	97
Per cent childhood type suspect cases of number tested	2.16	2.88	3.03	2.51	0.862 (1–120)
Grade		3.05	2.97	2.55	0.916 (1–110)
High		1.97	3.27	2.40	0.666 (1–150)

Note: The 1929–1930 Clinic examined 7,318 high school pupils, but separate records were not kept of them.

Attention is called particularly to the much higher incidence of pulmonary tuberculosis in the high school than in the elementary school group (approximately three times) and the frequency of the adult type of the disease among children actually in contact with tuberculosis in their homes. It is in accordance with these findings that our school program has been modified.

As a means of finding cases of pulmonary tuberculosis, routine examination of school children with tuberculin test and X-ray is unquestionably expensive. As a preventive measure, however, its usefulness is far more comprehensive than that alone. Before the beginning of regular school examinations in Massachusetts, pulmonary tuberculosis in children under eighteen was practically never diagnosed until it had reached an advanced stage, and as a result treatment was of little avail.

Of the first 400 cases admitted to Westfield only 5 per cent were in a minimal stage of the disease on admission and when checked in 1932 only 45 living could be located and 75 per cent were known to be dead. For the past five years over 50 per cent of the pulmonary cases admitted to Westfield have been in a minimal stage, with an optimum chance for recovery.

Much is yet to be learned about the relationship of childhood type of tuberculosis to the adult pulmonary disease but we have been able to demonstrate its practical importance. Thus, in a group of school children found to have childhood tuberculosis between 1924 and 1927, the subsequent incidence of pulmonary tuberculosis has been five times that of a similar group, positive to the tuberculin test but without demonstrable signs of childhood tuberculosis.

What is perhaps the greatest contribution of the Ten Year Program to the control of tuberculosis in Massachusetts is the least tangible—effective dissemination of public health information about tuberculosis. There is little prospect that tuberculosis will be controlled by immunization or environmental measures. Prevention is peculiarly an individual problem and to get people to utilize the measures now available we must have an understanding of the essentials of infection, diagnosis and treatment by the general public to a far greater degree than is necessary in most communicable diseases. The examination of 400,000 children in practically every city and town in the Commonwealth, together with the personal contacts with parents, teachers, nurses and doctors has, we believe, created a consciousness of the problems of tuberculosis which is bound to be of the greatest value in the application of further control measures.

Subsidy

The State subsidy to cities and towns for the hospitalization of tuberculous patients in sanatoria approved by the Department of Public Health has again risen from $450,590.00 in 1933 to $461,419.37 in 1934. This increase is due largely to the fact that the new Worcester County Sanatorium has been in operation for the entire year of 1934. As all of the county and all of the approved city sanatoria have been operated at practically full capacity for the year, there should be little further increase in the subsidy unless more beds are added to some of the present institutions.

LAKEVILLE STATE SANATORIUM

Resident Officers

Leon A. Alley, M.D., *Superintendent.*
John J. Decker, M.D., *Assistant Superintendent.*
Arthur Kanserstein, M.D., *Senior Physician.*
Louis Alpert, M.D., *Assistant Physician.*
Raphael N. Joseph, M.D., *Assistant Physician.*
Chin S. Chang, M.D., *Assistant Physician.*
Emanuel Kline, D.M.D., *Dentist.*
Caroline T. White, R.N., *Superintendent of Nurses.*
Grace Daley, *Head Teacher.*
Marion N. Atwood, *Head Occupational Therapist.*
Susan M. Murphy, *Head Housekeeper.*
Chester Taylor, *Steward.*
Robert A. Kennedy, *Chief Power Plant Engineer.*
T. Frank Mahony, *Head Farmer.*
Florence S. Monroe, *Treasurer.*

Non-Resident Officers

Zabdiel B. Adams, M.D., *Senior Physician, Orthopedist.*
Louis A. O. Goddu, M.D., *Senior Physician, Orthopedist.*
Roger C. Graves, M.D., *Senior Physician, Urologist.*
Fletcher H. Colby, M.D., *Senior Physician, Urologist.*
William P. Beetham, M.D., *Senior Physician, Ophthalmologist*
George A. Moore, M.D., *Senior Physician, Surgeon.*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-fifth annual report of the Lakeville State Sanatorium for the year ending November 30, 1934.

Financial Statement

During the year there has been expended $258,477.56 for maintenance, a gross weekly per capita cost of $17.42. There has been collected from miscellaneous sources (the total of all collections) $135,796.88. Deducting this amount from the gross maintenance expenses leaves a net expense of $122,680.68 and a net weekly per capita cost of $9.15. There has been collected from private sources $3,779.00, from cities and towns $130,621.13, from the State Board of Retirement $114.00, and from sales $1,281.75, plus $1.00 paid by Plymouth County for land damages in widening road by our water supply.

There were 9 patients supported wholly or in part by private funds, 189 by cities and towns, 4 state wards, 41 wholly by state, and 40 on whom settlement has not been determined.

As authorized by Chapter 162, Acts of 1934 ($6,700.00 for Lamp Treatment Room and Equipment, Men's Ward) $6,638.98 was expended during 1934. Not completed. As authorized by Chapter 162, Acts of 1934 ($6,700.00 for Lamp Treatment Room and Equipment, Women's Ward) $6,665.18 was expended during 1934. Not completed. As authorized by Chapter 162, Acts of 1934 ($4,000.00 for X-ray Machine and Fluoroscope) $58.35 was expended during 1934. Under Emergency Public Works Commission Construction Docket 1354 Mass. State Project H-1 $5,000 was appropriated for two Sewage Filter Beds; $3,627.48 was expended during 1934. Not completed.

Population

There were 271 patients in the sanatorium at the beginning of the year, December 1, 1933, and 283 patients at the close, November 30, 1934. The largest number present at any one time was 298 and the smallest 271. The daily average number of patients was 285.27, children 170.08, adults 115.19. There were 204 patients admitted during the year. For the classification of patients admitted, your attention is called to Table 6. The average age of patients admitted was 26 years. Including deaths there were 192 patients discharged, and the average duration of residence was 426 days. Of those discharged 130 gained 2,289.25 pounds, an average gain of 17.6 pounds per person. Of those discharged there were 86 arrested, 7 apparently arrested, 19 quiescent, 26 improved, 3 unimproved, 24 deaths, 8 not considered (duration of treatment being less than one month) and 19 non-tuberculous. There were 104,124 hospital days of treatment, 913 more than last year. The average number of employees and officers during the year was 180.58.

Medical Report

Because of the seriousness of renal tuberculosis as shown by the high mortality rate in this group, the absolute necessity of an early diagnosis is constantly impressed upon us if we are to prevent the extensive destruction of kidney tissue and the extension to other parts of the genito-urinary system. Our observations and end results show that, unless the diagnosis is made early in these cases and while the disease may still be unilateral, the prognosis is poor. Early diagnosis resulting in early nephrectomy in those unilateral cases where there is no demonstrable disease on the other side presents the best possibility for an arrest or cure. We have made a careful study during the year of patients who have shown albumen in the urine where previous examinations had been negative. Of twenty-nine urines examined fourteen have shown the presence of tubercle bacilli. Guinea pig inoculation of all urines of this nature is now practiced routinely as it appears to be our most valuable guide to an early positive diagnosis of renal tuberculosis, especially in those cases where the patient is symptom free.

The policy of operating earlier on new patients has been adopted where their condition, both general and local, seemed to warrant this procedure, and has, we believe, contributed somewhat in shortening the length of residence. The value of prolonged post-operative general sanatorium treatment in these cases cannot be overestimated.

More frequent biopsies have resulted in earlier diagnoses in both the tuberculous and non-tuberculous cases. Non-tuberculous cases have, as a result, been transferred to the proper hospitals for treatment following the pathological study made possible by this procedure.

A child admitted with tuberculosis of the spine was found to be also suffering from diphtheria. No other case of contagious disease appeared during the year.

Nine and three-tenths per cent of the 204 patients admitted during the year showed evidence of pulmonary infection.

Institutional Activities

The teaching activities by the medical staff were continued in the form of lectures to the following groups and organizations: Boston University students, Middlesex College of Medicine and Surgery, Massachusetts Medical Society—Plymouth District, District Health Officers, Massachusetts Association of Boards of Health, theological students, and American College of Surgeons.

The number of theological students training in the sanatorium was increased from three to five this year. The results have been encouraging and this work will undoubtedly continue and expand depending largely, of course, on the number of scholarships available for this type of training from the theological school.

The preliminary work in connection with the examination of school children, in the southern parts of Bristol and Plymouth counties, that is to be taken care of by the staff at this institution, has already resulted in requests being received from the boards of health and school committees of several communities.

Personnel Changes

Dr. Richard C. Cooke resigned as assistant physician on September 30, 1934, to accept a position with the Federal Government. Dr. C. Winthrop Houghton resigned October 17, 1934, to accept an appointment at the State Infirmary at Tewksbury. Dr. Raphael N. Joseph was appointed assistant physician to succeed Dr. Cooke and Dr. Peter Ferrini, who previously served three years as senior physician at this institution, has accepted a reappointment to succeed Dr. Houghton.

It is with the deepest regret that we note the death of our former head occupational therapist, Miss Katharine Nute, who died at her home in Fall River in March, 1934. Miss Marion N. Atwood of Middleboro was appointed head occupational therapist, assuming her duties with the department on July 5, 1934.

Miss Mary C. O'Connell, head school teacher since November, 1928, resigned in March, 1934, and Miss Grace Daley, who has been an assistant teacher here for several years was promoted to succeed Miss O'Connell.

Improvements and Changes

C.W.A. projects made possible new ceilings in the children's east ward, a heavier power line to the men's ward and the replacement of considerable open wiring in the men's ward thus eliminating a serious fire hazard. A much-needed addition to the occupational therapy workshop was also provided in this way. This addition with considerable new equipment has increased the working facilities so that during the year 634 shop classes were held. Many acres of the water shed at Clear Pond were cleared of brush and 10,000 seedling pines set out.

A P.W.A. project made possible two additional eighty-feet-square filter beds in addition to our existing filter beds.

As authorized by the Legislature under Chapter 162, Acts 1934, two new lamp rooms were constructed and equipped and artificial heliotherapy made possible in November in these two new buildings, connecting with the men's and women's wards. This should further shorten the length of residence of patients as it will be possible to treat many strictly bed patients who previously could not be transported to the lamp room on the children's west ward. It is interesting that our figures show that the length of residence of patients discharged has been shortened by 106 days and it does not seem unreasonable to expect that the facilities for artificial heliotherapy now available will shorten the duration of treatment even more.

The new X-ray equipment also authorized by the above Chapter and Acts has been installed.

RECOMMENDATIONS

We have again requested, in the budget for the coming year, appropriations for additional ice boxes and separate electrical refrigerating equipment to be installed in the basement of the Administration Building. The present boxes are inadequate for our needs and the old refrigerating machinery in the power plant is heavily overtaxed during the warm months of the year.

While requests have not been made in the budget for the following items, existing conditions call for their early consideration:

1. A new fireproof male employees' building. The present one is the one that was made possible by remodeling the barn in 1925. The inside construction is such that it requires constant repairing. The building is crowded and several male employees are housed in unsuitable quarters in other parts of the institution.
2. At present, members of the resident medical staff are housed in small apartments in the upper story of the Administration Building. For those married and with children the quarters are inadequate and poorly located. Staff houses would contribute much to the comfort of the staff and their families and encourage longer lengths of service of valuable, trained physicians.
3. A new laundry building with equipment. The laundry of the sanatorium is now being done, and has been done for several years, at the State Farm at Bridgewater. This is unsatisfactory and expensive for both institutions.
4. A new greenhouse is needed to replace the present one which is much too small for the starting of many of the farm crops. The condition of the existing greenhouse is such that further repairs are hardly justified.
5. A new modern children's hospital building of fireproof construction should be erected to replace the old children's building known as Children's East. The present building consists of open wards with no single rooms which are badly needed for the sick cases. No space is now available for play rooms or recreational facilities for the small ambulatory patients.

ACKNOWLEDGMENTS

To all the clergymen in attendance during the year, I express the sincere appreciation of all the patients and employees. The religious services each week have been most helpful and the Sunday School for the children has been most valuable.

To those patients and employees who, through their friends, have made entertainments of all kinds available, I express the thanks of everyone who has been privileged to enjoy them.

It would be amiss not to mention and thank those who made possible the excellent decorations in the wards at Christmas, also those through whose generosity each child felt that Santa Claus did not forget.

My thanks and appreciation I extend to those loyal and faithful employees who have helped to carry on the work during the past year. They merit your public approval.

To you and other members of the Department I express my appreciation for the continued confidence and helpful cooperation.

SURGICAL REPORT

Operations

The following operations were performed during the year:

Appendectomies	3
Arthrodeses:	
Elbow	2
Hip	7
Knee	3
Spine	2
Tibio-astragaloid	1
Amputation of finger	1
Amputation of hand	1
Biopsies:	
Hip	1
Knee	1
Cervical glands	3
Tibia	1
Wrist	1
Cecostomies	2
Cauterization of cervix	1
Cauterization of gangrenous tissue of hip	1
Curettage of hip	1
Curettage of humerus	1
Curettage of radius and ulna	2
Curettage of sinus tracts	2
Dissection of sinuses	2
Epididymovasectomies	2
Hemorroidectomy	1
Herniotomies	3
Incision and drainage:	
Supra pubic abscess	1
Hip	1
Fistula in ano	1
Abscess chest wall	1
Laparotomies	2
Mastoidectomy	1
Nephrectomies	4
Incision and drainage of kidney	1
Osteotomy knee	2
Osteotomy and bifurcation of hip	1
Skin graft	1
Section of two dorsal nerve roots	1
Resection of bursa from hip	1
Cystoscopies	35
Tonsillectomies and adenoidectomies	40
Infected hands and fingers	4
Lacerations including those requiring sutures	11
Boil on neck	2
Removal of cyst	1
Removal of external semiluna cartilage from knee	1
Removal of polyp from nose	1
	158

Casts

Plaster casts for the year were as follows (types classified):

Anterior shells	17
Posterior shells	17
Buckets	2
Cylinder to arm	13
Cylinder to knee	53
Cylinder to wrist	8
Cylinder with boot	15
Jackets	68
Jackets with helmet	15
Jackets with shoulder spica	8
Jackets with single short spica	23
Jackets with double short spica	39
Jackets with long spica	15
Jackets with straps	101
Short spica	43
Long and short spica	36
Double long spica	3
Moulds for feet	2
Moulds for neck	4
Splints to arms	4
Splints to legs	6
	492

Consultation Examinations

	Positive	Suspicious	Negative	Extra-Pulmonary	Re-Exam.	Ex-Patients	Totals
Out-patients	6	8	59	5	12	54	144
Employees	–	–	140	–	–	–	140
	6	8	199	5	12	54	284

Laboratory Reports

Laboratory, X-ray and Photographic Report

		Number
Clinical Microscopy		
Blood	Hemoglobin determination	967
	Red blood cell counts	967
	White blood cell counts	973
	Differential counts	545
	Blood culture	9
	Blood grouping	7
	Coagulation time	42
	Bleeding time	42
Chemical Analysis:		
	Blood sugar	15
	Non-protein nitrogen	212
	Guaiac test for occult blood	129
	Gastric contents	4
	Van den Bergh test	3
	Icterus	2
Sputum	Positive T.B.	3
	Negative T.B.	491
Urine Analysis		5,163
Spinal fluid	Positive T.B.	1
	Negative T.B.	4
Feces		147
Pleural fluid		4
Bacteriological and Serological Tests.		
Nose and throat cultures	Negative K.L.	288
	Positive K.L.	12
Smears and cultures		3,275
Isolation of tubercle bacilli		747
Phenolsulphonphthalein tests		268
Typhoid agglutination tests (Widal)		94
Milk plate counts		2
Blood drawn for Wassermann and Hinton tests		309
Von Pirquet test	Positive	176
	Negative	6
Mantoux tests	Positive	3
	Negative	17
Injections of material into guinea pigs		342
Autopsies:	Positive T.B.	117
	Negative T.B.	225
Pathology.		
Surgical specimens		43
Biopsies		3
Post-mortem cases		12
Tissue sections (celloidin)		334
Tonsils		19
Preparation of Media (each month).		
Glycerine bouillon		11
Glycerine agar potato		2
Blood agar plate		8
Petroff's medium		12
Leoffler's blood medium		17
Eosin methylene blue agar		1
		16,073

Pathological Diagnosis.

Histological tuberculosis	7
Chronic inflammation	12
Appendicitis	4

Proven Tuberculosis.

Diagnosis (by guinea pig)

Tuberculous abdomen	3
Tuberculous ankle	2
Tuberculous chest wall	3
Tuberculous colitis	1
Tuberculous elbow	1
Tuberculous empyema	1
Tuberculous epididymitis	5
Tuberculous foot	1
Tuberculous gland	9
Tuberculous hip	10
Tuberculous kidney	42
Tuberculous knee	4
Tuberculous meningitis	3
Tuberculous rib	1
Tuberculous sacro-iliac	2
Tuberculous shoulder	2
Tuberculous skin	2
Tuberculous spine	16
Tuberculous trochanter	1
Tuberculous vulva	1
Tuberculous wrist	1
	134

Examinations for other hospitals.

Urine	3
Guinea pig test	5
Tonsils	14
Smear for G.C.	3
Throat culture	3
Pathological examination	3
Blood count	2
Blood grouping	4
Non-protein nitrogen	2
Blood sugar	3
	42

X-rays

Number of X-rays taken from December 1, 1933, to November 30, 1934 2,315

Photographs

Number of photographs taken from December 1, 1933, to November 30, 1934 391

DENTAL REPORT

From December 1, 1933, to November 30, 1934

Examinations	616	Radiographs	236
Prophylactic treatments	459	Irrigations	218
Fillings:		Vincent's Infection treatments	12
Permanent teeth	701	Root canal treatments	26
Deciduous teeth	77	Pulpectomy	2
Extractions:		General Anesthesia:	
Permanent teeth	219	Ether	2
Deciduous teeth	215	Ethyl chloride	2
Treatments	830	Local anesthesia:	
Restorations:		Novocaine	224
Dentures:		Ethyl chloride	64
Full	15	Topical	148
Partial	1	Oral surgical operations	17
Repair	5	Orthodontia treatments	41
Clamps—Davis	2		
Bridges:			4,133
Repair	1		
Visits			2,151
New patients			219
Dismissals			388

Tomato juice has been continued throughout the year with all the patients in both children's wards. The observations noted following the use of tomato juice with control groups for three years, checking the teeth as an index of its value as a source of vitamins, led us to the adoption of the above procedure. The large number of arrested caries and low incidence of new caries has been most striking.

SCHOOL REPORT

The educational activities have shown a definite increase during the year. Fifty-one patients have been enrolled in University Extension correspondence courses, twenty-one in the Home Hygiene Class, nine graduated from the class in Americanization, and twelve patients have worked regularly on the monthly issue of the sanatorium paper, "The Interpreter." This fall a Girl Scout Troop was organized with fifteen members. This activity was made possible by the Middleboro Council of the Girl Scouts of America.

Our graded school work has been carried on with one hundred and sixteen children enrolled, with the result that the children discharged during the year have in most instances been able to return to their proper classes upon their return to school.

Respectfully submitted,

LEON A. ALLEY, M.D.
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Adults		Children		
	Males	Females	Males	Females	Totals
Patients in the Sanatorium Nov. 30, 1933	66	46	90	69	271
Patients admitted Dec. 1, 1933, to Nov. 30, 1934	71	45	43	45	204
Patients discharged Dec. 1, 1933, to Nov. 30, 1934	70	53	33	36	192
Patients remaining in Sanatorium, Nov. 30, 1934	69	40	98	76	283
Daily average number of patients	68.5068	46.6849	95.0821	74.9972	285.2710
Deaths (included in number discharged)	13	3	4	4	24

TABLE 2.—*Civil Condition of Patients Admitted*

Single	35	19	43	45	142
Married	34	21	–	–	55
Widowed	2	–	–	–	2
Divorced	–	3	–	–	3
Separated	–	2	–	–	2
Total	71	45	43	45	204

TABLE 3.—*Age of Patients Admitted*

Under 5 years	–	–	10	3	13
5 to 9 "	–	–	5	14	19
10 to 14 "	–	–	12	10	22
15 to 19 "	–	–	12	18	30
20 to 29 "	32	10	4	–	46
30 to 39 "	16	18	–	–	34
40 to 49 "	13	10	–	–	23
50 to 59 "	5	2	–	–	7
60 to 69 "	4	5	–	–	9
70 and over	1	–	–	–	1
Total	71	45	43	45	204

Average Age 26 years.

TABLE 4.—*Nativity and Parentage of Patients Admitted*

	Adults						Children						Totals		
	Males			Females			Males			Females					
Place of Nativity	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:															
Massachusetts	26	10	8	16	3	4	36	8	16	41	23	21	119	44	49
Other New England States	10	5	4	6	5	3	2	3	3	2	1	2	20	14	12
Other States	6	4	2	4	3	4	1	5	2	1	2	4	12	14	12
	42	19	14	26	11	11	39	16	21	44	26	27	151	72	73
Other Countries:															
Armenia	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Bulgaria	1	–	1	–	–	–	–	–	–	–	–	–	1	–	1
Czechoslovakia	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Canada	5	8	9	9	15	15	2	9	2	1	2	2	17	34	28
England	2	1	2	1	2	1	–	–	–	–	1	1	3	4	4
Finland	–	–	–	1	–	1	–	–	–	–	–	–	1	–	1
Germany	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Greece	2	3	3	–	–	–	–	–	–	–	2	2	2	5	5
Hawaiian Islands	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
India	–	–	–	–	–	–	–	–	–	–	2	–	–	2	–
Ireland	2	5	7	1	5	5	–	2	2	–	–	1	3	12	15
Italy	6	11	11	–	1	1	1	6	7	–	4	4	7	22	23
Latvia	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Lithuania	1	1	2	–	–	–	–	2	2	–	–	–	1	3	4
Newfoundland	1	–	1	–	–	–	–	1	–	–	–	–	1	1	1
Poland	–	3	3	–	–	–	–	–	–	–	1	1	–	4	4
Portugal	4	6	6	2	2	2	1	4	3	–	5	3	7	17	14
Russia	2	7	7	2	4	4	–	1	1	–	1	–	4	13	12
Scotland	1	1	–	1	1	2	–	–	–	–	–	–	2	2	2
Sweden	–	–	–	–	–	–	–	–	–	–	–	2	–	–	2
Syria	1	1	1	1	1	1	–	1	1	–	1	1	2	4	4
Turkey	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Unknown	–	2	3	1	3	2	–	1	2	–	–	–	1	6	7
	71	71	71	45	45	45	43	43	43	45	45	45	204	204	204

TABLE 5.—*Residence of Patients Admitted*

	Adults	Children	Totals
Amesbury	1	–	1
Andover	1	1	2
Attleboro	1	1	2
Avon	1	–	1
Boston	34	26	60
Boylston	–	1	1
Bradford	–	1	1
Braintree	–	2	2
Bridgewater	1	–	1
Brockton	1	1	2
Brookline	1	–	1
Cambridge	9	2	11
Chelsea	4	3	7
Chicopee	1	–	1
Dartmouth	1	–	1
Easton	1	–	1
Everett	4	–	4
Fall River	2	1	3
Falmouth	–	1	1
Framingham	2	–	2
Hingham	–	1	1
Holliston	1	–	1
Lawrence	4	3	7
Leominster	1	–	1
Lexington	1	–	1
Lowell	2	–	2
Lynn	1	3	4
Malden	3	2	5
Manchester	1	–	1
Marblehead	1	–	1
Marlboro	1	–	1
Maynard	–	1	1
Medford	–	2	2
Melrose	2	–	2
Methuen	1	–	1
Middleboro	1	–	1
Middleton	1	–	1
Millis	–	1	1
Montague	1	–	1
New Bedford	6	5	11
Newton	–	3	3
North Adams	1	–	1
Norwood	1	1	2
Pittsfield	–	2	2
Quincy	5	2	7
Reading	1	–	1
Revere	2	–	2
Richmond	2	–	2
Salem	1	3	4
Saugus	–	1	1
Sharon	1	–	1
Shirley	–	1	1
Somerville	2	4	6
Southboro	–	2	2
Springfield	1	2	3
Sutton	–	1	1
Swampscott	–	1	1
Taunton	1	2	3
Waltham	3	–	3
Wellesley	1	1	2
Wellfleet	–	1	1
Westboro	–	1	1
Westfield	–	1	1
Westwood	1	–	1
Woburn	–	1	1
	116	88	204

TABLE 6.—*Diagnosis on Admission*

	ADULTS		CHILDREN		Totals	Per-centages
	Males	Females	Males	Females		
One Lesion						
Tb. abscess chest wall	1	–	–	–	1	.49
Tb. adenitis, cervical	–	6	4	4	14	6.86
Tb. adenitis, mesenteric	2	–	1	3	6	2.94
Tb. ankle	2	–	1	–	3	1.47
Tb. colitis	–	1	–	–	1	.49
Tb. dactylitis	–	1	–	–	1	.49
Tb. elbow	–	–	1	–	1	.49
Tb. epididymitis	1	–	–	–	1	.49
Tb. fibula	–	–	1	–	1	.49
Tb. hip	6	1	3	5	15	7.35
Tb. knee	1	–	3	1	5	2.45
Tb. nephritis	6	2	–	–	8	3.92
Tb. ophthalmia	1	2	–	2	5	2.45
Tb. peritonitis	2	2	3	3	10	4.90
Tb. pleura	1	–	–	–	1	.49
Tb. rib	–	–	1	–	1	.49
Tb. sacro-iliac	1	–	–	–	1	.49
Tb. shoulder	–	–	2	–	2	.98
Tb. skin	–	2	–	–	2	.98
Tb. spine	8	2	7	6	23	11.27
Tb. symphysis pubis	2	–	–	1	3	1.47
Tb. tibia	–	–	1	–	1	.49
Tb. greater trochanter	1	–	–	–	1	.49
Tb. uterus	–	1	–	–	1	.49
Tb. wrist	1	–	–	1	2	.98
	36	20	28	26	110	–
One Lesion with X-Ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical	–	1	–	–	1	.49
Tb. adenitis, axillary	–	–	1	–	1	.49
Tb. ankle	–	–	1	–	1	.49
Tb. hip	–	–	–	1	1	.49
Tb. knee	–	1	–	–	1	.49
	–	2	2	1	5	–
One Lesion with Evidence of Pulmonary Tuberculosis Inactive						
Tb. adenitis, cervical	–	1	–	–	1	.49
Tb. foot	–	1	–	–	1	.49
Tb. spine	1	2	–	–	3	1.47
Tb. wrist	1	–	–	–	1	.49
	2	4	–	–	6	–

TABLE 6.—*Diagnosis on Admission*—(Continued)

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
One Lesion with Pulmonary Tuberculosis Active						
Tb. adenitis, cervical . .	1	–	–	–	1	.49
Tb. hip	1	–	1	–	2	.98
Tb. spine	1	–	–	–	1	.49
	3	–	1	–	4	–
Two Lesions						
Tb. adenitis, cervical and axillary	1	2	–	–	3	1.47
Tb. adenitis, cervical, bilateral	–	–	–	1	1	.49
Tb. adenitis, cervical, Tb. dactylitis, arrested . .	–	–	1	–	1	.49
Tb. adenitis, cervical and inguinal	–	–	1	–	1	.49
Tb. adenitis, cervical, Tb. ophthalmia	–	1	–	1	2	.98
Tb. adenitis, mesenteric, Tb. rib, arrested	–	–	1	–	1	.49
Tb. adenitis, mesenteric, Tb. enteritis	1	–	–	–	1	.49
Tb. colitis, Tb. peritonitis .	1	–	–	–	1	.49
Tb. epididymitis, bilateral .	2	–	–	–	2	.98
Tb. knee, Tb. hip, arrested .	–	1	–	–	1	.49
Tb. nephritis, bilateral . .	–	1	–	–	1	.49
Tb. nephritis, Tb. colitis .	2	1	1	–	4	1.96
Tb. ophthalmia, bilateral .	1	1	–	2	4	1.96
Tb. peritonitis, Tb. adenitis cervical, arrested . . .	–	–	1	–	1	.49
Tb. peritonitis, Tb. adenitis mesenteric	1	–	1	–	2	.98
Tb. spine, Tb. knee . . .	1	–	–	–	1	.49
Tb. spine, Tb. nephritis, arrested	1	–	–	–	1	.49
Tb. spine, Tb. peritonitis .	–	1	–	1	2	.98
T. spine, Tb. sacro-iliac . .	–	–	1	–	1	.49
	11	8	7	5	31	–
Two Lesions with X-Ray Evidence of Pulmonary Infection						
Tb. nephritis, Tb. cystitis .	1	–	–	–	1	.49
Tb. ophthalmia, bilaterial .	–	1	–	–	1	.49
Tb. spine, Tb. nephritis . .	–	–	–	1	1	.49
	1	1	–	1	3	–
Three Lesions						
Tb. adenitis, cervical, inguinal and mesenteric . . .	–		–	1	1	.49
Tb. adenitis, mesenteric, cervical and axillary . . .	–	–	–	2	2	.98
Tb. epididymitis, bilateral, Tb. nephritis	2	–	–	–	2	.98
Tb. nephritis, Tb. epididymitis, Tb. spine	1	–	–	–	1	.49
Tb. ophthalmia, left, Tb. adenitis, cervical and axillary .	–	–	–	1	1	.49
Tb. peritonitis, Tb. pyo-hydronephrosis, Tb. entro-colitis .	–	1	–	–	1	.49
Tb. spine, Tb. hip, Tb. abscess sterno-clavicular . . .	1	–	–	–	1	.49
Tb. spine, Tb. nephritis, Tb. elbow, arrested . . .	1	–	–	–	1	.49
Tb. spine, Tb. sacro-iliac, bilateral	1	1	–	–	2	.98
Tb. spine, Tb. greater trochanter, Tb. lesser trochanter .	1	–	–	–	1	.49
	7	2	–	4	13	–
Four Lesions						
Tb. spine, Tb. adenitis, cervical axillary and inguinal . .	–	–	–	1	1	.49
	–	–	–	1	1	–
Four Lesions with Evidence of Pulmonary Tuberculosis, inactive						
Tb. cystitis, Tb. nephritis, Tb. epididymitis, bilateral, Pul.	1	–	–	–	1	.49
	1	–	–	–	1	–

TABLE 6.—*Diagnosis on Admission*—(Concluded)

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
Five Lesions						
Tb. adenitis, cervical, Tb. wrist, Tb. ankle, Tb. fibula, Tb. spine	–	–	1	–	1	.49
	–	–	1	–	1	–
Six Lesions						
Tb. adenitis, mesenteric, cervical, mediastinal, inguinal and axillary, Tb. hip . . .	–	1	–	–	1	.49
	–	1	–	–	1	–
Non-tuberculous						
Abscess in back . . .	1	–	–	–	1	.49
Adenitis, cervical . . .	–	–	–	1	1	.49
Arthritis	2	1	–	1	4	1.96
Colitis	1	–	–	–	1	.49
Duodenal ulcer (Tb. sacro-iliac, arrested)	1	–	–	–	1	.49
Enteritis	1	–	–	–	1	.49
Femur	1	–	–	–	1	.49
Foot	–	–	–	1	1	.49
Genito-urinary tract . .	–	1	–	–	1	.49
Hip	–	–	–	1	1	.49
Hodgkins disease . . .	–	–	1	–	1	.49
Hydrocephalus	–	–	1	–	1	.49
Lymphoma	–	1	–	–	1	.49
Osteomyelitis	–	–	–	1	1	.49
Pyo-nephrosis, renal calculi .	–	1	–	–	1	.49
Spine	–	–	–	1	1	.49
Wrist	1	–	–	–	1	.49
Unclassified	2	3	2	1	8	3.92
	10	7	4	7	28	–

TABLE 7.—*Condition on Discharge*

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
Arrested	22	20	21	23	86	44.79
Apparently arrested . .	1	3	2	1	7	3.64
Quiescent	9	10	–	–	19	9.90
Improved	11	11	2	2	26	13.54
Unimproved	2	1	–	–	3	1.56
Deaths	13	3	4	4	24	12.50
Not considered	3	2	1	2	8	4.17
Non-tuberculous	9	3	3	4	19	9.90
	70	53	33	36	192	–

TABLE 8.—*Deaths*

DURATION OF DISEASE	ADULTS		CHILDREN		Totals	LENGTH OF RESIDENCE IN SANATORIUM				
						ADULTS		CHILDREN		Total
MONTHS	Males	Females	Males	Females		Males	Females	Males	Females	
Less than 1 month	–	–	–	–	–	1	1	–	1	3
1 to 2 months	–	–	–	–	–	1	–	–	–	1
2 to 3 "	–	–	–	–	–	2	–	–	1	3
3 to 4 "	–	–	–	–	–	2	–	–	–	2
4 to 5 "	–	–	–	–	–	1	–	–	–	1
5 to 6 "	–	–	–	–	–	–	–	–	–	–
6 to 7 "	1	–	–	–	1	1	–	–	–	1
7 to 8 "	–	–	–	–	–	–	–	–	–	–
8 to 9 "	–	–	–	–	–	–	1	–	–	1
9 to 10 "	–	–	–	–	–	–	–	–	–	–
10 to 12 "	–	–	–	–	–	1	–	1	1	3
12 to 18 "	2	–	–	–	2	2	–	1	–	3
18 to 24 "	1	–	–	2	3	1	–	–	–	1
Over 2 years	9	3	4	2	18	1	1	2	1	5
	13	3	4	4	24	13	3	4	4	24

TABLE 9.—*Causes of Death*

	ADULTS		CHILDREN		Totals
	Males	Females	Males	Females	
Tb. colitis, Tb. adenitis, mesenteric	–	1	–	–	1
Tb. hip with draining sinus and ulcerations	–	–	–	1	1
Tb. hip, Tb. nephritis, Tb. epididymitis	1	–	–	–	1
Tb. hip, Tb. sacro-iliac	1	–	–	–	1
Tb. nephritis	1	–	–	–	1
Tb. nephritis, Tb. cystitis	1	–	–	–	1
Tb. nephritis, Tb. cystitis, miliary Tb.	–	–	1	–	1
Tb. osteomyelitis, chronic suppurative	–	–	1	–	1
Tb. peritonitis, Addison's disease, amyloidosis	–	–	–	1	1
Tb. peritonitis, Tb. pyo-hydro nephrosis, Tb. entero-colitis	–	1	–	–	1
Tb. shoulder, Tb. adenitis, cervical, Tb. hand	1	–	–	–	1
Tb. spine	4	–	1	–	5
Tb. spine, amyloidosis	1	–	–	1	2
Tb. spine, hilum Tb.	–	–	1	–	1
Tb. spine, lobar pneumonia	–	–	–	1	1
Tb. spine, Tb. nephritis, Tb. hip	–	1	–	–	1
Tb. spine, Tb. nephritis, Tb. meningitis, amyloidosis	1	–	–	–	1
Tb. trochanter, Tb. hip, amyloidosis	1	–	–	–	1
Subacute pancreatitis, paralytic ileus, myocardial insufficiency, Tb. knees	1	–	–	–	1
	13	3	4	4	24

Financial Report, Lakeville State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

STATEMENT OF EARNINGS

Board of patients:			
Private	$3,550 00		
Cities and towns	130,841 31		
		$134,391 31	
Personal services:			
Reimbursement from Board of Retirement		$114 00	
Sales:			
Food	$118 39		
Furniture and household supplies	11 85		
Medical and general care	61 45		
Farm	913 92		
Garage, stable and grounds	128 69		
Repairs, ordinary	26 50		
Miscellaneous—junk	28 95		
Total sales		$1,289 75	
Miscellaneous:			
Rents, land claim	1.00		
Total miscellaneous		$1.00	
Total earnings for the year			$135,796 06
Total cash receipts reverting and transferred to the State Treasurer			$135,796 88
Accounts receivable outstanding Dec. 1, 1933		$38,476 74	
Accounts receivable outstanding Nov. 30, 1934		38,475 92	
Accounts receivable decreased			$ .82

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$5,312 94
Appropriation, current year	$253,095 00	
Chapter 213, Act 1934	5,500 00	
Chapter 213, Act 1934	4,231 00	
		$262,826 00
Total		$268,138 94
Expenditures as follows:		
Personal services	$56,381 30	
Food	32,003 87	
Medical and general care	10,552 16	
Farm	13,994 16	
Heat, light and power	13,625 16	
Garage, stable and grounds	2,372 21	
Travel, transportation and office expenses	3,598 52	
Religious instruction	1,281 90	
Clothing and materials	770 05	
Furnishings and household supplies	16,381 84	
Repairs, ordinary	3,608 11	
Repairs and renewals	3,538 71	
Grounds	407 56	
Total maintenance expenditures		$258,515 55
Balance of maintenance appropriation, Nov. 30, 1934		9,623 39
Estimated outstanding liabilities, Nov. 30, 1934		$6,721 45

SPECIAL APPROPRIATIONS

Balance December 1, 1934, brought forward		
Appropriations for current year		22,400 00
Total		$22,400 00
Expended during the year (see statement below)	$16,989 99	
Reverting to Treasury of Commonwealth	*	
(Star balances below that are reverting)		
Balance November 30, 1934, carried to next year		$5,410 01

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Lamp Room Equip. (Men's)	1934–162	$6,700 00	$6,638 98	$6,638 98	$61 02
Lamp Room Equip. (Women's)	1934–162	6,700 00	6,665 18	6,665 18	34 82
X-ray machine and fluoroscope	1934–162	4,000 00	58 35	58 35	3,941 65
Sub total of specials		$17,400 00	$13,362 51	$13,362 51	$4,037 49
P.W.A. Docket 1354 Mass. State Project H-1	1934	5,000 00	3,627 48	3,627 48	1,372 52
Totals		$22,400 00	$16,989 99	$61,989 99	$5,410 01

PER CAPITA

During the year the average number of patients has been		285.2711
Total cost of maintenance	$258,515 55	
Equal to a weekly per capita cost of (52 weeks to year)	17.42711	
Total receipts for the year	135,796 88	
Equal to a weekly per capita of	9.1543	
Total net cost of maintenance for year	258,515 55	
	135,796 88	
(Total maintenance less total receipts)		$122,718 67
Net weekly per capita	8.27275	

Respectfully submitted,

FLORENCE S. MONROE,
Treasurer.

Inventory, Lakeville State Sanatorium

GRAND SUMMARY SHEET

November 30, 1934

REAL ESTATE

Land, 251.61 acres	$18,065 00	
Buildings	533,892 26	
Betterments (additions and improvements)	167,710 78	
Total, Real Estate		$719,668 04

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$381 74	
Food	2,719 34	
Clothing and materials	281 84	
Furnishings and household supplies	1,784 09	
Medical and general care	1,963 74	
Heat, light and power	399 93	
Farm	597 54	
Garage, stable and grounds	78 08	
Repairs	2,574 64	
Total		$10,780 94

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$2,135 91	
Clothing and materials	692 61	
Furnishings and household supplies	46,994 72	
Medical and general care	13,500 74	
Heat, light and power	81 55	
Farm	27,304 42	
Garage, stable and grounds	3,712 67	
Repairs	2,327 50	
Total		$96,750 12

GRAND SUMMARY

Real Estate—Total	$719,668 04	
Personal Property—Undistributed Supplies, Total	10,780 94	
Personal Property—Distributed Supplies, Total	96,750 12	
Total		$827,199 10

NORTH READING STATE SANATORIUM

RESIDENT OFFICERS

CARL C. MACCORISON, M.D., *Sanatorium Superintendent.*
EARLE C. WILLOUGHBY, M.D., *Assistant Superintendent.*
GERALD H. CARON, M.D., *Assistant Physician.*
ANNA H. MAXWELL, M.D., *Assistant Physician.*
RUFUS F. LITTLE, M.D., *Assistant Physician.*
JAMES H. POWERS, D.M.D., *Dentist.*
ETHEL M. KNIGHT, *Institution Treasurer.*
ELLEN E. BENT, R.N., *Principal, School of Nursing.*
ELIZABETH HASLETT, *Head Housekeeper.*
BEULAH F. PHILBROOK, *Head School Teacher.*
J. ELLIS DOUCETTE, *Sanatorium Steward.*
DANIEL J. SCOTT, *Chief Power Plant Engineer.*
EDWARD J. LEARY, *Head Farmer.*

NON-RESIDENT OFFICERS

EDWARD D. CHURCHILL, M.D., *Consultant, Thoracic Surgeon*
ZABDIEL ADAMS, M.D., *Consultant, Orthopedic Surgeon.*
HALSEY B. LODER, M.D., *Consultant, General Surgeon.*
HAROLD L. HIGGINS, M.D., *Consultant, Pediatrician.*
THOMAS ODONEAL, M.D., *Consultant, Opthalmologist.*
CHARLES W. DEWOLFE, M.D., *Consultant, Laryngologist.*

Report of the Superintendent

To HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor of submitting the twenty-fourth annual report of the North Reading State Sanatorium for the year ending November 30, 1934.

FINANCIAL STATEMENT

During the year there has been expended for maintenance $216,051.04, a gross weekly per capita cost of $15.89. There has been nothing expended for Special Appropriations during 1934.

There has been collected from miscellaneous sources $80,644.03 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of $135,407.01. The net weekly per capita cost was $10.02. There has been collected from private funds $3,110.00; from cities and towns, $76,879.57. Twenty cases (including twelve from the Division of Child Guardianship) were supported by private funds; 347 by cities and towns and ninety-two wholly by the state.

POPULATION

There were 269 patients at the beginning of the fiscal year and 246 at the close. The largest number present at any one time was 277 and the smallest number present at any one time was 241. The daily average number of patients was 259.9 as against 269.95 last year. There were 228 patients admitted during the year, thirty-seven less than last year.

There were 182 cases admitted from cities and towns over 25,000 population, and 46 cases from cities and towns under 25,000 population. The average age of patients was 9.75. Although the average age remains practically the same, there was an increased number of children admitted between the ages of 14 and 19 with pulmonary type tuberculosis. Including deaths, there were 251 cases discharged, and the average duration of residence was 12 months and 1 day. Of those discharged, 210 patients gained 2,465¾ lbs., an average gain of 11.7 lbs. per person.

Of the discharges there were 25 apparently well, 118 arrested, 39 apparently arrested, 7 quiescent, 22 improved, 22 unimproved, 2 not considered—the duration of treatment being less than thirty days. There were 16 deaths, the same number as last year.

There were 94,862 hospital days.

Average number of officers and employees: Males, 55.76; females, 74.057; total, 129.818.

MEDICAL REPORT

During the year the Sanatorium has made greater use of pneumothorax treatment and surgical aid in the treatment of children suffering from adult type of disease. At the end of the year, 17 patients were receiving pneumothorax treatment, 36 children in all received artificial pneumothorax during the year and 603 refills were given. Twenty-two of these refills were given to a discharged Rutland patient and two employees (graduate nurse and assistant physician.)

Pneumolysis was performed on three patients, and three other patients had a phrenic nerve operation. Four patients had a thoracoplasty, and lobectomy was done on three patients.

At the end of the fiscal year, 80 of the 246 cases showed the adult type disease; 44 of these, however, had the inactive type of disease and the majority were attending school.

The latter part of October, the Sanatorium took over the school clinic work in Haverhill, Methuen, Lawrence, North Reading, Wakefield, Reading, Cambridge and Lowell. At the end of the fiscal year, 2,485 children in 22 schools of Lawrence, in grades 6, 9 and 11 were tested, the reactors X-rayed, and the majority examined. Dr. Caron has been detailed to this work.

Last year, 1,278 patients were examined in our out-patient clinic and 254 examinations were made in the consultation clinics held in Lawrence and Haverhill. It is gratifying to note that there is a steady increase in the number of patients applying for examination in the out-patient department and in the consultation clinics.

Dr. Cooper, our consultant from the Department of Mental Diseases, together with her psychologist, Miss Culbert, has held 14 clinics at the Sanatorium and has examined 45 children.

Thirteen eye, ear, nose and throat clinics were held by our consultants, Doctors Odoneal and DeWolfe. One hundred and seventeen children were referred to these clinics. Fifty-five were fitted to glasses, and tonsils and adenoids removed from 26 patients. In addition, Dr. DeWolfe did bronchoscopic examinations on four patients. Dr. Edward Churchill, our consultant in chest surgery, held three clinics during the year and 45 patients were referred.

During the past year there were ten cases of whooping cough beginning in January, 1934, and fifteen cases of chicken pox. A diagnosis of scarlet fever was made on one patient, and also one patient was diagnosed as measles.

In November, 1934, all employees who came in contact with children were Dick tested and are being immunized against scarlet fever. One hundred and six employees were Dick tested and 19, or 18 per cent, were positive reactors.

Institutional Activities

The following programs, consisting of lectures, clinics, etc., were held at the Sanatorium:

January 16, 1934: Annual meeting of the Southern Middlesex Health Association.

March 21, 1934: Senior class of the New England Sanatorium Training School.

March 23 and 29, 1934: Special class of Dr. Robert H. Nichols.

May 1, 1934: Southern Middlesex Health Association, Health Day.

July 20, 1934: Dr. Harold L. Higgins of the Massachusetts General Hospital and his class in pediatrics.

October 11, 1934: Dr. Wilson G. Smillie of the School of Public Health, Harvard University, and his class in Public Health Administration.

November 22, 1934: Second year class of the training school of the Malden Hospital.

In addition, the staff have given talks on tuberculosis, illustrated by moving pictures, at the Lawrence Lion's Club, Lawrence Tuberculosis Association, Training School for Nurses at the Essex County Sanatorium and the North Reading Grange.

Personnel

Dr. Rufus F. Little was appointed on the staff as assistant physician July 10th.

I regret to report the resignation of the Rev. J. L. McCorison in October.

Improvements and Changes

The three old engines in the power plant were repaired at a cost of $1,175. Additional hydrants have been installed to take care of the south side of the Administration Building; also the nurses' hall, medical building, Pavilions B East and C East. The contract has been signed for the extension of the sprinkler system in the attic of the nurses' hall. A garage holding thirty-one cars has been built for the rental of employees, part of the work being done by the CWA and the ERA.

The wood verandas on Pavilion B West and C East have been replaced with cement.

The school house was painted inside and out, labor being furnished by CWA and ERA.

The small water tank by the power plant was painted and put in good condition.

Murals were painted in Wards 2 and 4, dining room of Ward 2, waiting room of our out-patient department, and the kindergarten class room at the school, as a CWA project.

Recommendations

This coming year our old 25,000 gallon wood stave tank, which supplies the sprinkler heads throughout the institution, should be replaced by a new wooden tank.

A new hydrant should be installed near the new garages which were constructed this last year.

Additional sprinkler heads have been recommended by the engineering division for the attics of the wards and pavilions and dormitories. They have also recommended a new 6 inch compound uniflow meter, four test wells, the installation of an irrigating pump and extension of the irrigating system. Our present irrigating pump is too small to handle the work and we have been compelled to use our larger fire pump several times daily during the past summer to take care of the load.

The installation of an irrigating pump will bring about a marked saving in the cost of electricity.

Our old laundry presses are in very bad condition and will have to be replaced this coming year.

We believe it to be economical to install oil burners in the kitchen and bakeshop ovens.

We are badly in need of new dental equipment.

In order to give greater comfort to the employees living in the upper floor of the Administration Building, I would recommend that the attic be insulated.

ACKNOWLEDGMENTS

I wish to thank the Rev. Father Brandley and his assistants, Rev. J. L. McCorison, Rev. George H. Gage, Rev. Warren Landers and Rabbi Zeldner, who have so faithfully conducted the religious services at the Sanatorium and taken care of the spiritual needs of our little patients.

I am greatly indebted to the many friends who have contributed so generously of their time and talents in entertaining the children and for the numerous gifts that have been donated from time to time.

I wish to thank the heads of departments and employees for their loyalty and cooperation during the past year.

LABORATORY REPORT

The following examinations were made in our laboratory:

Sputum examinations:	Positive	233	
	Negative	731	964
Urine analyses			1,715
White blood counts			417
Red blood counts			312
Differential blood counts			408
Hemoglobin estimations			340
Blood sedimentation tests			47
Babcock tests			39
Bacterial counts for milk			39
Throat cultures			64
Other cultures and smears			81
Widal tests			61
Spinal fluids			2
Blood coagulation tests			14

DENTAL REPORT

The following table is a summary of the work done this year:

Prophylactic treatments	471
Fillings (permanent teeth)	644
Fillings (temporary teeth)	281
Extractions (permanent teeth)	417
Extractions (temporary teeth)	719
Treatments	281
Restorations	3
X-rays	337
Irrigations	213
Visits	893
New patients	276
Dismissals	296

SCHOOL REPORT

Owing to the large number of pupils in the combined fifth and sixth grades, it became necessary to separate them. To meet this requirement, a temporary appointment was made. Mrs. Leary was released from the first grade and Miss Brink took her place. At present there are forty-three in the combined fifth and sixth grades and one in the hospital, who will enter in a few days. It would be impossible to teach forty-four pupils at one time in our short session of two hours and twenty minutes and also when children are continually coming and going as they are here. Not only is Miss Brink's service necessary in the above mentioned capacity but also it has proved very beneficial to the children immediately below regular school age, as she is able to conduct kindergarten activities with them in the forenoon. These little people are much happier throughout the day because they are taught, and play together. Their songs and games carry over into their afternoon playtime and there is a marked improvement in their behavior. Miss Brink's work is very valuable to the lives of these little children and it is hoped that her appointment may be made permanent.

An important development of the work for the year has been the introduction of bedside instruction in the wards. This work was carried on daily throughout the summer months. It was found to be so interesting and helpful to these young people, that it has been continued with gratifying results. For some time it was observed that many conscientious boys and girls, who were too ill to attend school, were concerned because their classmates were getting ahead of them. We have found that this instruction occupies their minds and tends to keep them contented and happy.

Our usual summer school was conducted this summer during a period of seven weeks. The total enrollment for the summer was approximately seventy-five. Not all continued through the season. As quickly as they individually completed their work, they were excused. It was found that some of the boys and girls required the time for making up their work to retain their class standing. There were others who elected the work with the desire to make extra grades. For example, Joseph Farina is now sixteen years of age. He entered the first grade three years ago, but on account of his age and size, he felt greatly out of place. He was delighted to have an opportunity to make up his work. Each year he has completed two years of grade work and is now in the eighth grade. He is somewhat retarded but is associating with boys of his own size and is very happy.

In our high school section, we have the largest number of students in its history. In the early fall we had an enrollment of thirty-four. One student has gone through all the grades of our school. Much time and careful attention have been given to the development of a curriculum for the high school grades.

The curriculum at present includes the following courses: English, French, typewriting, shorthand, bookkeeping, economic geography, music appreciation, physical training, manual training, practical arts, and sewing. Twenty units of credits comprise one year's work. Fourteen of our students are carrying full requirement and eight of these are carrying additional subjects.

The extra-curricula department offers a wide range of activities. As the children select various projects, a careful study is being made of their individual aptitudes and abilities. They are encouraged to continue in the work best suited to their condition. Two lathes and a power jig saw have been added to our equipment. These machines are very beneficial to the older boys who are not physically able to use the hand wood-working tools. Mr. Holmes instructs them one forenoon fortnightly and Mr. Walsh helps them one forenoon weekly.

School Statistics

	Average Daily Attendance	Per Cent of Attendance	Total Enrollment
Kindergarten	20.85	95.7	48
Grade I	17.00	93.25	47
Grade II	17.96	94.99	55
Grades III and IV	33.46	96.5	81
Grades V and VI	48.72	97.69	69
Grades VII and VIII	27.56	96.84	72
High School	21.35	97.99	50
Entire School	186.90	96.14	422

Respectfully submitted,

CARL C. MACCORISON, M.D.
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium Dec. 1, 1933	140	129	269
Patients admitted from Dec. 1, 1933, to Nov. 30, 1934, incl.	99	129	228
Patients discharged from Dec. 1, 1933, to Nov. 30, 1934, incl.	113	138	251
Patients remaining in Sanatorium November 30, 1934	126	120	246
Daily average number patients	130.03	129.87	259.90
Deaths (included in number discharged)	9	7	16

TABLE 2.—*Classification on Application Blanks and on Admissions.*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1933	1934	1933	1934	1933	1934
Minimal	30	38	10	23	3.77	10.09
Moderately advanced	24	28	16	11	6.04	4.82
Advanced	17	11	26	22	9.81	9.65
Unclassified	9	23	4	1	1.50	.44
Childhood type tuberculosis	165	114	165	150	62.26	65.79
Malnutrition	0	0	14	10	5.28	4.39
No disease	0	0	13	8	4.90	3.50
Pleurisy with effusion	1	2	–	–	–	–
Bronchiectasis	0	0	3	0	1.13	–
Acute bronchitis	0	0	1	0	.38	–
Empyema (chronic)	1	0	1	0	.38	–
Lung abscess	0	0	1	0	.38	–
Pulmonary tuberculosis	2	2	0	0	–	–
Observation	14	8	0	0	–	–
Deferred	0	0	5	0	1.89	–
Tbc. cervical adenitis	1	0	0	0	–	–
Resolving broncho-pneumonia	0	0	0	1	–	.44
Pyro-pneumothorax	0	0	1	0	.38	–
Convalescent pyro pneumothorax	0	0	1	0	.38	–
Glandular tuberculosis	1	0	0	0	–	–
Convalescing pneumonia	0	0	1	0	.38	–
Atelectasis	0	0	1	0	.38	–
Bronchial asthma	0	0	1	0	.38	–
Tuberculous spine	0	0	1	0	.38	–
Tuberculous pneumonia	0	1	0	0	–	–
Tuberculosis of peritoneum	0	1	0	1	–	.44
Pyelitis	0	0	0	1	–	.44
	265	228	265	228		

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single	99	129	228
Total	99	129	228

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Total	Per Cent
Under 5 years	18	11	29	12.7
5 to 9 years	33	29	62	27.2
10 to 14 years	41	68	109	47.8
15 to 19 years	7	21	28	12.3
20 years and over	0	0	0	–
Average age	8.48	10.72	9.75	–
Total	99	129	228	100.0

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACE OF NATIVITY	MALES			FEMALES			TOTAL		
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:									
Massachusetts	89	33	34	118	41	54	207	74	88
Other New England States	2	7	8	1	8	4	3	15	12
Other States	3	5	5	5	6	9	8	11	14
	94	45	47	124	55	67	218	100	114
Other Countries:									
Albania	0	1	1	0	1	1	0	2	2
Armenia	0	0	0	0	2	2	0	2	2
Austria	0	0	2	0	0	0	0	0	2
Azores	0	0	0	0	1	1	0	1	1
Canada	1	13	14	4	16	10	5	29	24
Cuba	0	1	0	0	0	0	0	1	0
England	1	2	3	0	1	1	1	3	4
Finland	0	1	1	0	3	2	0	4	3
France	0	0	1	0	0	0	0	0	1
Germany	0	1	0	0	1	0	0	2	0
Greece	0	0	0	0	3	2	0	3	2
Holland	0	0	0	0	1	1	0	1	1
Ireland	0	4	5	0	9	10	0	13	15
Italy	0	13	9	1	17	10	1	30	19
Jamaica	0	1	1	0	0	0	0	1	1
Lithuania	2	2	4	0	1	1	2	3	5
Newfoundland	0	1	0	0	2	4	0	3	4
Norway	0	1	1	0	0	1	0	1	2
Poland	0	2	0	0	1	2	0	3	2
Portugal	0	1	0	0	5	3	0	6	3
Russia	1	4	4	0	0	0	1	4	4
Scotland	0	2	1	0	1	4	0	3	5
Spain	0	0	0	0	0	1	0	0	1
Sweden	0	0	0	0	1	0	0	1	0
Syria	0	0	0	0	3	3	0	3	3
Turkey	0	0	0	0	2	3	0	2	3
West Indies	0	1	2	0	1	0	0	2	2
Unknown	0	3	3	0	2	0	0	5	3
Total Foreign	5	54	52	5	74	62	10	128	114
Grand Total	99	99	99	129	129	129	228	228	228

TABLE 6.—*Residence of Patients Admitted*

Amesbury	3	Haverhill	3	Millis	1	Salisbury	1
Arlington	5	Lawrence	6	Natick	1	Saugus	5
Beverly	2	Leicester	1	Newburyport	2	Somerville	8
Boston	60	Littleton	1	Newton	4	Stoughton	2
Cambridge	26	Lowell	3	North Reading	1	Swampscott	1
Chelsea	9	Lynn	7	Peabody	1	Tewksbury	1
Cohasset	1	Malden	4	Quincy	21	Waltham	1
Concord	1	Manchester	2	Reading	7	Watertown	5
Dracut	1	Maynard	1	Revere	8	Weymouth	5
Everett	4	Medford	4	Rockport	1	Woburn	1
Gloucester	4	Milford	1	Salem	2	Total	228

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Total	Percentage
Childhood tuberculosis	72	78	150	65.79
Minimal	8	15	23	10.09
Moderately advanced	3	8	11	4.82
Advanced	1	21	22	9.65
Malnutrition	6	4	10	4.39
No disease	6	2	8	3.50
Tuberculosis of peritoneum	0	1	1	.44
Resolving broncho-pneumonia	1	0	1	.44
Pyelitis	1	0	1	.44
Unclassified	1	0	1	.44
Total	99	129	228	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Total	Percentage
Apparently well	17	8	25	9.96
Arrested	67	51	118	47.01
Apparently arrested	13	26	39	15.54
Quiescent	1	6	7	2.79
Improved	7	15	22	8.77
Unimproved	4	18	22	8.77
Died	3	13	16	6.36
Not considered	1	1	2	.80
Total	113	138	251	100.00

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month	0	0	0	1	2	3
1 to 2 months	0	0	0	0	0	0
2 to 3 months	0	0	0	2	1	3
3 to 4 months	0	1	1	0	2	2
4 to 5 months	0	0	0	0	0	0
5 to 6 months	0	0	0	0	1	1
6 to 7 months	0	0	0	0	1	1
7 to 8 months	0	0	0	0	1	1
8 to 9 months	0	2	2	0	0	0
9 to 10 months	1	0	1	0	0	0
10 to 11 months	0	0	0	0	1	1
11 to 12 months	0	1	1	0	0	0
12 to 18 months	1	3	4	0	2	2
18 to 24 months	0	2	2	0	0	0
Over 2 years	1	4	5	0	2	2
Total	3	13	16	3	13	16

TABLE 10.—*Causes of Death*

	Males	Females	Total
Tuberculosis of lungs	3	12	15
Tuberculosis of peritoneum	0	1	1
Total	3	13	16

Financial Report, North Reading State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

STATEMENT OF EARNINGS

Board of patients:			
Private	$3,123 00		
Cities and towns	71,139 02	$74,262 02	
Personal services:			
Reimbursement from Board of Retirement		$99 00	
Sales:			
Food	$20 68		
Clothing and materials	149 69		
Furniture and household supplies	53 58		
Medical and general care	58 26		
Heat, light and power	3 80		
Farm	23 20		
Garage, stable and grounds	69 16		
Repairs, ordinary	5 95		
Miscellaneous—junk	61 32		
Total sales		$445 64	
Miscellaneous:			
Rents			
Garages	$154 25		
Total, miscellaneous		$154 25	
Total earnings for the year			$74,960 91
Total cash receipts reverting and transferred to the State Treasurer			$80,644 03
Accounts receivable outstanding Dec. 1, 1933		$26,509 62	
Accounts receivable outstanding Nov. 30, 1934		20,826 50	
Accounts receivable decreased			5,683 12

Maintenance Appropriation

Balance from previous year, brought forward		$10,969 84
Appropriation, current year	$216,670 00	$216,670 00
Total		$227,639 84
Expenditures as follows:		
Personal services	$135,499 24	
Food	36,250 93	
Medical and general care	6,998 73	
Farm	2,747 50	
Heat, light and power	13,075 57	
Garage, stable and grounds	2,115 65	
Travel, transportation and office expenses	2,769 49	
Religious instruction	1,475 47	
Clothing and materials	2,259 85	
Furnishings and household supplies	5,037 98	
Repairs, ordinary	3,022 84	
Repairs and renewals	4,802 12	
Total maintenance expenditures		$216,055 37
Balance of maintenance appropriation, Nov. 30, 1934		11,584 47
Estimated outstanding liabilities, Nov. 30, 1934		$5,486 70

Special Appropriations

Balance December 1, 1933, brought forward		$3,120 41
Appropriations for current year		
Total		$3,120 41
Expended during the year (see statement below)		
Reverting to Treasury of Commonwealth	*$3,120 41	
(Star balances below that are reverting)		3,120 41
Balance November 30, 1934, carried to next year		

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Employees' Building	115–1930 170–1932	$75,000 00	–	$72,406 08	$2,593 92*
Certain Filter Beds	69–1932	17,000 00		16,473 51	526 49*
		$92,000 00		$88,879 59	$3,120 41

Per Capita

During the year the average number of patients has been		259.9
Total cost of maintenance	$216,055 37	
Equal to a weekly per capita cost of (52 weeks to year)	15.986	
Total receipts for the year	80,644 03	
Equal to a weekly per capita of	5.967	
Total net cost of maintenance for year (total maintenance less total receipts)		$135,411 34
Net weekly per capita	10.019	

Respectfully submitted,

ETHEL M. KNIGHT,
Treasurer.

Inventory: North Reading State Sanatorium

GRAND SUMMARY SHEET

November 30, 1934.

Real Estate

Land, 112.81 acres	$9,495 22	
Buildings	641,425 14	
Betterments (additions and improvements)	142,233 66	
Total, Real Estate		$793,154 02

Personal Property Undistributed Supplies

Travel, transportation and office expenses	$306 23	
Food	4,528 13	
Clothing and materials	3,034 88	
Furnishings and household supplies	2,296 48	
Medical and general care	646 81	
Heat, light and power	1,606 10	
Farm	372 53	
Garage, stable and grounds	98 34	
Repairs	71 65	
		$12,961 15

Personal Property Distributed Supplies

Travel, transportation and office expenses	$4,597 54	
Clothing and materials	5,504 98	
Furnishings and household supplies	79,503 35	
Medical and general care	28,427 44	
Heat, light and power	76 50	
Farm	6,855 47	
Garage, stable and grounds	6,779 19	
Repairs	7,694 13	
Total		$139,438 60

Grand Summary

Real Estate—Total		$793,154 02
Personal Property—Undistributed Supplies, Total	12,961 15	
Personal Property—Distributed Supplies, Total	139,438 60	
		$945,553 77

RUTLAND STATE SANATORIUM

Resident Officers

Ernest B. Emerson, M.D., *Superintendent.*
Paul Dufault, M.D., *Assistant Superintendent.*
Armand Laroche, M.D., *Senior Physician.*
Gabriel Nadeau, M.D., *Senior Physician.*
Charles K. McCarthy, M.D., *Assistant Physician.*
Israel Kahalas, M.D., *Assistant Physician.*
Ruby Delphina McCarthy, M.D., *Assistant Physician.*
Gulli Lindh Muller, M.D., *Assistant Physician (Pathologist).*
Delya E. Nardi, R.N., *Principal of the School of Nursing.*
Rena Blanche Nauss, R.N., *Assistant Principal of the School of Nursing.*
Marguerite McNamara, *Dietitian.*
Philip G. Zaramba, *Steward.*
Mary A. Boyle, *Institution Treasurer.*
Harry U. Wendell, *Chief Power Plant Engineer.*
Joseph A. Carroll, *Head Farmer.*
Nora G. O'Connell, *Head Housekeeper.*

Non-Resident Officers

Frank H. Washburn, M.D., *Senior Physician.*
Edward D. Churchill, M.D., *Senior Physician.*
G. Arnold Rice, M.D., *Senior Physician.*
Shields Warren, M.D., *Senior Physician (Pathologist).*
William J. O'Connor, D.M.D., *Dentist.*

Report of the Superintendent

To Dr. Henry D. Chadwick, *Commissioner, Department of Public Health:*

I have the honor to submit the thirty-eighth annual report of the Rutland State Sanatorium for the year ending November 30, 1934.

Financial Statement

During the year there has been expended $272,710.91 for maintenance, a gross weekly per capita cost of $14.89. There has been expended from Special Appropriation authorized by Chapter 162, Acts 1934, Sprinklers, $5.55; from Emergency Public Works Commission, Construction Massachusetts State Projects, Docket 1354-H 2, Reconstruction Sewer Lines, $6,471.12; Docket 2275, H 3, New Boilers, $21,140.55.

There has been collected from miscellaneous sources (the total of all collections) $192,270.83, an increase of $854.97 over the collection of last year. Deducting this amount from the gross maintenance expense leaves a net expense of $80,440.08, a net weekly per capita cost of $4.39. There has been collected from private sources $31,797.00, the largest collection since 1925; from cities and towns $76,649.54; from Worcester County $1,829.59; from the Tubercular Hospital District of Chelsea, Revere and Winthrop $80,727.25, and by the Attorney General $110.00. .

Eighty-five cases were supported wholly or in part from private funds; ninety-eight cases by cities and towns; eighty-six wholly by the State; forty-four by the Tubercular Hospital District of Chelsea, Revere and Winthrop, and one by Worcester County. There were forty-three cases on which settlement had not been determined.

POPULATION

There were 360 patients in the sanatorium at the beginning of the year and 357 at the close. The largest number present at one time was 371 and the smallest 329. The daily average number of patients was 352.08, an increase of 10.52 over last year. There were 395 patients admitted during the year, 38 more than last year; 31 minimal, 128 moderately advanced, 203 far advanced, 15 unclassified, 4 childhood type, 3 bronchiectasis, 2 pleurisy with effusion, 1 pleurisy and anemia, 3 lung abscess, 2 bronchial asthma, 1 multiple lung abscesses and empyema, 1 cancer of lung, and 1 empyema. There were 256 admitted from cities and towns of over 25,000 population and 139 from cities and towns under 25,000 population. The average age of patients admitted was 31.81, an increase of .88. Including deaths there were 398 patients discharged, 33 more than last year. The average duration of residence was 388 days, 1 more than last year. Of those discharged, 230 gained 2,151¾ pounds, an average gain of 9.36 pounds per person. Of the discharged, there were 14 apparently arrested cases, 4 more than last year; 165 quiescent cases, 5 more than last year; 63 improved; 55 unimproved; 1 bronchiectasis; 18 not considered, the duration of treatment being less than one month. There were 16 discharged non-tuberculous. There were 2 on which no diagnoses were made. There were 64 deaths, 2 more than last year. There were 128,510 days of treatment, 3,841 days more than last year.

Average number of employees and officers during the year: males, 121.18; females, 82.01; total, 203.19.

Further statistical details are shown in the tables which are a part of this report.

MEDICAL REPORT

Consultation clinics have been held monthly in Athol, Gardner, Southbridge and Milford.

These clinics and the out-patient service at the sanatorium show an increase in the number of patients examined as noted in the accompanying tables.

These clinics have established a point of contact between the physician, the laity and the sanatorium, which has resulted in an early diagnosis, and early treatment in many instances. I feel that a spirit of cooperation has developed that can lead only to further and more effective work in the field of tuberculosis.

The pathological service, established last year, has shown a steady and most satisfactory development and has been a lively stimulus for more and better work.

There has been a considerable increase in the use of collapse therapy.

Eighty-two more cases were given artificial pneumothorax than last year. The results perhaps have not been particularly striking inasmuch as the procedure has in many instances been carried out as a last resort measure and in cases hitherto considered unsuitable for collapse. We believe, however, that some of these cases have been helped, that others have derived no benefit, and that no one has been jeopardized.

It goes without saying that if pneumothorax is to be given as a last resort measure to the hopeless, or near-hopeless cases generally considered unsuitable, the results of this treatment cannot compare with the results obtained in the selected cases hitherto collapsed. It may be a question whether the results in this group be included in the general results of the whole number or be classified by themselves. The statistics may be misleading either way.

Regardless of whatever statistics one might like to build up, I believe that we should continue giving pneumothorax as a last resort measure with the expectation that an occasional case will be helped and that none will be subjected to a hazard that outweighs the chances for improvement.

The increase in the number of pneumothorax cases is an index of the increasing amount of nursing and medical care required in the present day treatment of tuberculosis: During the year, 1,389 more pneumothorax treatments were given; there were 18 more oleothorax cases with 56 more treatments; and 8 more general surgical cases.

With all this there is a corresponding increase in the amount of post-operative care, laboratory, X-ray, and clerical work.

The papers published by the staff during the year are listed at the end of the Commissioner's report.

The following papers, not yet published, were read at a meeting of the Worcester District Medical Society at the sanatorium:

"What We Have Learned From One Hundred Intra Pleural Pneumolyses," Frank H. Washburn, M.D.

"Roentgenological Odds and Ends," Paul Dufault, M.D.

The following papers, not yet published, were read at the meeting of the Eastern Section of the American Sanatorium Association:

"When Should Pneumothorax be Discontinued," Paul Dufault, M.D.

"What Information May Be Gained by Blood Studies in Artificial Pneumothorax," Gulli Lindh Muller, M.D.

Institutional Activities

The Training School is in its twenty-seventh year.

Lectures and demonstrations have been given by the medical staff and special instruction by the following: Mrs. Helen Hackett, Consultant, Public Health Nursing; Dr. N. A. Nelson, Gonorrhea and Syphilis; Dr. George Arnold Rice, Special Senses.

The hospital affiliations are:

Cooley-Dickinson Hospital	8 months
Boston City Hospital	1 year
Boston Floating Hospital	3 months
North Reading State Sanatorium	3 months

Graduation exercises were held October 19, 1934. The address was given by Prof. Herman F. Brase, State Teachers College, Lowell, Massachusetts.

The following were awarded diplomas: Agnes Geraldine Locker, Marguerite Theresa LaFosse, Helen Maria McCarty, Anne Isobel Whitney, Louise Tetlow.

The following have been awarded diplomas after completing the six months' postgraduate course: Elizabeth Susan Carr, a graduate of the Brantwood Hospital, Oxford, North Carolina; Rose Anna Houston, a graduate of Long Island Hospital, Long Island, New York; Hazel M. Bonzey, a graduate of Worcester City Hospital, Worcester, Massachusetts.

There are 30 student nurses: 13 seniors, 8 juniors and 9 preliminaries.

The April meeting of the Wachusett Medical Improvement Society was held at the sanatorium.

Dr. Robert H. Nichols and Dr. Paul Dufault conducted two postgraduate clinics.

Farm: The unusually severe weather of 1934 winter killed approximately 50 acres of alfalfa—with an estimated loss of 200 tons of this feed. Oats and peas were planted for a quick crop. There was also a reduction in the hay crop. It will probably be necessary to purchase about 40 tons of hay to carry through the year.

The herd is tuberculosis free.

There were 674,204 pounds of milk produced with an average of 11,309 pounds per cow.

Personnel Changes

The medical staff remains the same as last year.

However calamitous the depression may be, the institution has fared well during these years with an improved personnel and continuity of service both of which are reflected in the morale and work done.

Following the decease of Olin C. Blaisdell, Philip G. Zaramba was promoted to the position of steward.

Improvements and Changes

C.W.A. Project No. 2698—For inside and outside repairs, there was expended $1,403.00, giving employment to 11 men for variable periods of time, a total of 2,062 hours.

Under this project there was also expended for materials charged to the maintenance appropriation $1,377.72, a total of $2,780.72.

Repairs and extensions were made to the staff dining room, to the lamp room and to the piggery.

C.W.A. Project No. 2697—For clearing brush and stones, there was expended $1,243.75, giving employment to 11 men for variable periods of time.

Tools and materials used in this project were charged to the maintenance appropriation.

New boilers and oil-burning equipment authorized under Emergency Public Works Commission, Construction Massachusetts State Projects, Docket No. 2275, —H-3, are now under construction.

The Project, Docket No. 1354,—H-2, reconstruction of sewers, has been completed.

The filter beds were abandoned and the sewerage turned into the Metropolitan Sewer Nov. 7, 1934.

RECOMMENDATIONS

The increase in the surgical and nursing work noted above is more than an incident of the past year; it marks the high point of a progressive increase, over a period of several years, which will likely continue. I am, therefore, recommending the appointment of one head nurse and two attendant nurses as permanent employees.

Many patients suffer from defective vision, or eye strain, and in some instances from conditions directly due to tuberculosis. These patients have been seen and treated at the sanatorium, or referred to an oculist without any official connection with the sanatorium. These conditions require treatment as much as any other complicating disease. I, therefore, recommend the appointment of an oculist to the staff, subject to 24 calls a year at a salary of $600.

Another junior clerk and stenographer is necessary if adequate records are to be kept. Prior to this year, much of this work has been done by convalescent patients with the expectation or hope that later they might be qualified for a position; but with the depression a Civil Service list has been established and there has been little incentive for the type of patient desired to come into the office. At best, it is a questionable policy.

An X-ray technician is recommended. This work is now done either by a physician alone, or with the assistance of a patient; again, this source of assistance is uncertain; furthermore, a physician's time should not be utilized developing and filing X-ray films.

For fire protection: a sum of $8,300.00 for the construction of a main loop around buildings, approximately 1,660 feet of 6 inch and 8 inch cast iron pipe and the extension of a 6 inch domestic and fire service main to the farm buildings, approximately 2,080 feet.

For water supply: a sum of $13,280.00 for the installation of a 150,000 gallon steel tank for additional domestic and fire service.

For surfaced road from Central Tree Road: a sum of $15,000.00.

For lightning protection: a sum of $1,360.00 for buildings not already protected.

Under 1935 Budget Item No. 12—Repairs and Renewals, I recommend the following items:

Post office boxes	$500.00
Repairs of verandas	3,100.00
Repair of hay barn	1,900.00
Remodeling old coal pit for vegetable cellar	450.00
Outside stairway to bull pen	275.00
Repairs to old milk house	200.00
Masonry repairs	1,000.00
Oil burning equipment for barns and houses	3,000.00
	$10,425.00

The upkeep of buildings has lagged during the years of depression and further delay of necessary repairs will not, to say the least, decrease the expense.

ACKNOWLEDGMENTS

It is with a deep sense of personal loss that I record the death of Olin C. Blaisdell, September 7, 1934, after nineteen years of service to this institution, the last thirteen years of which he served as steward.

Not only respected but loved by those with whom he came in daily contact, his going came as a grievous shock following an illness of less than forty-eight hours.

No one can appreciate better than I his sterling qualities, his sincerity, loyalty, devotion to duty and ideals, after seventeen years of business and social relations. Yet I but voice the feelings of all who knew him. The Commonwealth has lost a "good and faithful servant."

The Rev. Father McNamara, the Rev. Father Sullivan, the Rev. Robert French, the Rev. Father Smith and Rabbi Zeldner have ministered to the spiritual needs of all—not in a mere perfunctory manner but in a way to bring comfort and peace to those racked in body and spirit.

The medical staff, nurses and employees have again given me their loyalty, support and cooperation; they have made possible whatever measure of service has been rendered.

In closing, may I express my appreciation of your confidence and support throughout the year.

Respectfully,
ERNEST B. EMERSON, M.D.
Superintendent.

SURGICAL REPORT

The following is a list of the surgical operations performed at the sanatorium:

Alcohol injection of sacral nerve	1
Appendectomy	14
Biopsy	7
Bronchoscopy	90
Adenectomy	3
Circumcision	1
Cystoscopy	5
Dilatation and curettage	4
Dilatation and insertion of Chamber's Pessary	2
Epididymectomy	1
Fistula-in-ano	2
Reduction of fracture	2
Pan hysterectomy	1
Pelviolithotomy	1
Phrenicectomy	55
Phrenic interruption	16
Intrapleural pneumolysis	63
Salpingectomy	1
Scalenotomy	20
Thoracoscopy	2
Thoracotomy	3
Tonsillectomy	8
Trachelorrhaphy	1
Transfusion	1
Excision of neoplasm—lipoma	1
Baldy-Webster operation	3
Oophorectomy	1
Orchidectomy, right and left	1
Total	310

Oleothorax cases	24
Oleothorax treatments	112
Artificial pneumothorax cases	333
Artificial pneumothorax cases (out-patient)	38
Artificial pneumothorax treatments	6,228
Aspirations (chest)	274

There were 29 thoracoplasties performed at the Massachusetts General Hospital.

LABORATORY

Urine examinations:	
Routine chemical	1,027
Microscopic	1,026
Qualitative sugar determination	1,700
Quantitative sugar determination	3
Acetone	1,711
Benzidin test for occult blood	53
Mosenthal test	6
Total chloride	9
Kidney function (P.S.P.) test	18
Sputum examinations: (increase over 1933, 888)	
Routine for tubercle bacilli	6,804
Concentration method for tubercle bacilli	9
Blood examinations:	
Culture	4
Red cell count	1,368
White cell count	1,714
Differential count with modified Schilling index	1,695
Hemoglobin determination (Hellige)	1,843
Icterus index	1,557
Reticulocyte count	333
Hematocrit	1,754
Erythrocyte sedimentation test	1,788
Coagulation time	178
Bleeding time	2
Van den Bergh test	1
Blood typing	5
Sugar (Folin's method)	68
Non-protein nitrogen	11
Widal reaction	105
Feces examinations:	
Benzidin test for occult blood	13
Ova, tubercle bacilli, etc.	22
Pleural fluid examinations:	
Culture	100
Smear	52
Spinal fluid examinations:	
Cell count	6
Chemical	4
Milk examinations:	
Bacteria count	22
Percentage of fat	38
Water examinations:	
Bacteria count	22
B. coli	33
Miscellaneous examinations:	
Culture	81
Smear	207
Test for amyloid disease (intravenous injection of Congo red)	1
Guinea pig inoculations and autopsies	125
Preparation of autogenous vaccine	4
Standardization of disinfectant	2
Preparation of microscopical sections	1,149
Total number of examinations (increase of 1933, 6,082)	26,673

Specimens sent from laboratory to Boston:

Cultures from urine and feces for B typhosus	67
Blood for Wassermann and Hinton tests	380
Spinal fluid for Wassermann and Gold Sol tests	5

Lectures in bacteriology to nurses' training school	24

Of the total number of patients in the sanatorium November 30, 1934 (357) 81.6% have had a positive sputum; 4.5% reported no sputum; tubercle bacilli were not found in 13.9%. Of the total number of patients whose sputum was examined 85.5% were positive. Autopsies 34 (51.5%). Surgical specimens 52.

Smallpox vaccinations, 241. Typhoid and Paratyphoid A and B inoculations, 226.

X-ray plates of chest, stomach, etc., 2,637, and dental X-rays, 438; total, 3,075.

The following tables indicate the work of the consultation service, clinics, out-patient and others:

Consultation Clinics:

Number of patients examined at the Gardner, Milford, Southbridge and Athol clinics, 750.

Diagnosis:

Tuberculosis	51	Childhood type	50
Tuberculosis, re-examination	20	Childhood type, re-examination	29
Non-tuberculous	209	Tuberculous pleurisy	1
Non-tuberculous, re-examination	5	Bronchiectasis	8
Observation	351		

Consultation cases to the number of 724 (193 more than last year) were referred for 878 examinations (272 more than last year) and 26 ex-patients (2 less than last year) reported for 35 follow-up examinations (the same as last year) making a total of 913 examinations (272 more than last year) at the consultation clinics.

Number of patients examined once, 658; twice, 100; four times, 5.

Number of ex-patients examined once, 19; twice, 6; four times, 1.

Number of physicians referring patients, 105 (3 less than last year).

There were 9 patients admitted to the sanatorium following examinations at the consultation clinics.

Sanatorium Out-Patient Clinic:

Patients referred by physician	278
Patients examined at own request	126
	404
Ex-patients examined at own request	194
Total	598

Diagnosis:

Non-tuberculous	158	Childhood type, re-examination	5
Tuberculosis	55	Bronchiectasis	3
Tuberculosis, re-examination	4	Lung abscess	1
Observation	139	Tuberculous pleurisy	5
Observation, re-examination	4	Tuberculous pleurisy, re-examination	1
Childhood type	29		
			404

This year 404 patients (64 more than last year) reported for 425 examinations (58 more than last year), and 194 ex-patients (35 more than last year) reported for 215 examinations (8 more than last year) making a total of 640 examinations at the sanatorium.

Number of patients examined once, 340; twice, 16; three times, 15; four times, 2.

Number of ex-patients examined once, 156; twice, 22; and three times, 5.

Number of physicians referring patients to the sanatorium, 122.

There were 17 patients admitted to the sanatorium following examinations at the sanatorium.

The total of all examinations made during the year exclusive of routine work was 1,553, 338 more than last year.

DENTAL REPORT

The following is a summary of the dental work done during the year:

Examinations	277	Prophylaxis	79
New patients	305	Fillings	492
Office visits	2,685	Impressions	23
Bed visits	26	Altering plates	11
Extractions in bed	14	Repairing plates	18
Extractions	388	Removing bridges	9
Post-extractions	270	Re-cementing bridges	2
Impacted extractions	12	Removing gold crowns	6
Emergency cases	6	Fitting plates	23
Root canal filling	4	Trimming plates	44
Socket curetted	6	Mouth washes	382
Osteomyelitis cases	4	Stomatitis treatments	15
Epulis tumor	1	Exostosis treatments	5
Pericementitis	12	Cellulitis	1
Gangrene stomatitis	2	Hemorrhages checked	2
Ankylosis	3	Restorations	23
Treatments	820	X-rays	438
Vincent's treatment	22	Irrigations	15
Gingivitis treatment	119	Gold inlays	3
Pyorrhoea treatment	63	Gold crowns	1
Gum treatment	113	Tightening clasps	14
Abscess cases	42	Vulcanite stomatitis	4
Lancing gums	16	Trismus	1
Scaling teeth	51	Hypertrophy gum cases	6
Removing bony process	4		

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in sanatorium November 30, 1933	178	182	360
Patients admitted December 1, 1933, to November 30, 1934, inclusive	197	198	395
Patients discharged December 1, 1933, to November 30, 1934, inclusive	203	195	398
Patients remaining in sanatorium November 30, 1934	172	185	357
Daily average number of patients	182.06	170.02	352.08
Deaths (included in number discharged)	38	26	64

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Percentage	
	1933	1934	1933	1934	1933	1934
Minimal	61	55	34	31	9.52	7.85
Moderately advanced	194	216	144	128	40.31	32.41
Far advanced	68	83	152	203	42.60	51.40
Unclassified	30	36	10	15	2.80	3.80
Childhood type	4	5	5	4	1.40	1.02
Tuberculous pleurisy	–	–	4	–	1.13	–
Chronic bronchiectasis	–	–	2	3	.56	.76
Non-tuberculous	–	–	2	–	.56	–
Lung abscess	–	–	2	3	.56	.76
Empyema	–	–	1	1	.28	.25
Hodgkin's disease	–	–	1	–	.28	–
Pleurisy with effusion	–	–	–	2	–	.50
Pleurisy and anaemia	–	–	–	1	–	.25
Bronchial asthma	–	–	–	2	–	.50
Multiple lung abscesses and empyema	–	–	–	1	–	.25
Cancer of lung	–	–	–	1	–	.25
	357	395	357	395		

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	95	108	203
Married	93	75	168
Widowed	7	11	18
Divorced	2	4	6
	197	198	395

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Totals	Percentages
Under 20 years	13	19	32	8.11
20 to 29 years	62	117	179	45.32
30 to 39 years	65	33	98	24.81
40 to 49 years	32	19	51	12.91
50 to 59 years	19	5	24	6.07
60 to 69 years	6	4	10	2.53
70 years and over	–	1	1	.25
Average age	34.29	29.32	31.81	–
Total	197	198	395	

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	120	36	50	122	36	42	242	72	92
Other New England States	11	14	9	17	13	13	28	27	22
Other States	15	9	12	13	15	7	28	24	19
Total Native	146	59	71	152	64	62	298	123	133
Other Countries (20)									
Total Foreign	51	130	123	46	130	129	97	260	252
Unknown	–	8	3	–	4	7	–	12	10
Grand Totals	197	197	197	198	198	198	395	395	395

TABLE 6.—*Residences of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Amherst	1	Great Barrington	2	Newton	10	Stoneham	1
Arlington	6	Hartford, Conn.	2	North Adams	5	Sudbury	1
Ashland	4	Hazardville, Conn.	1	Northampton	2	Tewksbury	1
Athol	1	Holyoke	32	North Brookfield	1	Thompsonville, Ct.	1
Attleboro	1	Hopedale	1	Orange	2	Townsend	2
Belchertown	1	Hopkinton	1	Palmer	6	Wakefield	2
Belmont	4	Hudson	1	Pittsfield	2	Walpole	1
Boston	74	Leicester	1	Providence, R. I.	1	Waltham	6
Brookline	3	Leominster	2	Putnam, Conn.	1	Watertown	11
Cambridge	10	Lexington	3	Quincy	1	Wayland	1
Chelsea	10	Lowell	11	Reading	3	Webster	2
Chicopee	6	Ludlow	3	Revere	18	Westfield	4
Concord	2	Lynn	2	Rutland	4	West Springfield	2
Dalton	1	Malden	4	Salem	3	Weymouth	1
Dedham	2	Manchester, Conn.	1	Seekonk	1	Wilmington	2
Easthampton	3	Maynard	1	Sherborn	1	Winchester	2
Everett	6	Medford	12	Shrewsbury	2	Winthrop	7
Fall River	3	Melrose	3	Somerville	20	Woburn	9
Foxboro	1	Montague	1	Southbridge	2	Worcester	3
Framingham	5	Natick	4	South Hadley	1	Wrentham	1
Gardner	2	New Bedford	2	Springfield	13		
						Total	395

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Minimal	8	23	31	7.85
Moderately advanced	60	68	128	32.41
Far advanced	114	89	203	51.40
Unclassified	7	8	15	3.80
Childhood type	2	2	4	1.02
Bronchiectasis	1	2	3	.76
Pleurisy with effusion	2	–	2	.50
Pleurisy and anaemia	–	1	1	.25
Lung abscess	1	2	3	.76
Bronchial asthma	1	1	2	.50
Multiple lung abscesses and empyema	–	1	1	.25
Cancer of lung	1	–	1	.25
Empyema	–	1	1	.25
	197	198	395	

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	6	8	14	3.52
Quiescent	90	75	165	41.46
Improved	25	38	63	15.83
Unimproved	24	31	55	13.82
Dead	38	26	64	16.08
Non-tuberculous	6	10	16	4.02
Not considered	13	5	18	4.52
Bronchiectasis	1	–	1	.25
No diagnosis	–	2	2	.50
	203	195	398	

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month	2	–	2	7	1	8
1 to 2 months	1	1	2	4	2	6
2 to 3 months	1	1	2	2	2	4
3 to 4 months	1	–	1	4	–	4
4 to 5 months	1	2	3	–	–	–
5 to 6 months	–	1	1	2	–	2
6 to 7 months	1	1	2	–	3	3
7 to 8 months	–	–	–	3	2	5
8 to 9 months	–	–	–	2	–	2
9 to 10 months	1	1	2	1	1	2
10 to 12 months	3	1	4	1	2	3
12 to 18 months	8	1	9	4	3	7
18 to 24 months	3	2	5	3	3	6
Over 2 years	16	15	31	5	7	12
	38	26	64	38	26	64

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	33	25	58
Pulmonary tuberculosis and tuberculosis of spine	1	–	1
Tuberculous enteritis, tuberculous peritonitis and amyloid disease of kidney	1	–	1
Cancer of lung	1	–	1
Purpura hemorrhagica	1	–	1
Multiple abscesses of left lung, and empyema	–	1	1
Carcinoma of pancreas with metastasis	1	–	1
	38	26	64

Financial Report, Rutland State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

STATEMENT OF EARNINGS

Board of patients:			
Private	$33,164 00		
Cities and towns	79,166 87		
Worcester County	1,031 52		
Chelsea, Revere and Winthrop T.B. District	37,825 98		
		$151,188 37	
Personal services:			
Reimbursement from Board of Retirement		$131 00	
Sales:			
Travel, transportation and office expenses	$12 52		
Food	139 66		
Furniture and household supplies	5 00		
Medical and general care	342 61		
Heat, light and power	4 24		
Farm	95 33		
Garage, stable and grounds	126 27		
Repairs, ordinary	7 20		
Total sales		$732 83	
Miscellaneous:			
Interest on bank balances	$1 54		
Rents	120 00		
Total, miscellaneous		$121 54	
Total earnings for the year			$152,173 74
Total cash receipts reverting and transferred to the State Treasurer			$192,095 71
Accounts receivable outstanding Dec. 1, 1933, adjusted		125,210 56	
Accounts receivable outstanding Nov. 30, 1934		85,288 59	
Accounts receivable decreased			39,921 97

Maintenance Appropriation

Balance from previous year, brought forward		$932 76
Appropriation, current year	$278,320 00	
Partial salary restoration	4,537 00	
		282,857 00
Total		$283,789 76
Expenditures as follows:		
Personal services	$157,802 73	
Food	45,125 55	
Medical and general care	13,103 16	
Farm	10,812 33	
Heat, light and power	22,844 06	
Garage, stable and grounds	2,726 20	
Travel, transportation and office expenses	3,575 64	
Religious instruction	1,752 17	
Clothing and materials	197 81	
Furnishings and household supplies	7,927 76	
Repairs, ordinary	5,465 78	
Repairs and renewals	1,377 72	
Total maintenance expenditures		$272,710 91
Balance of maintenance appropriation, Nov. 30, 1934		11,078 85
Estimated outstanding liabilities, Nov. 30, 1934		$7,640 72

Special Appropriations

Balance December 1, 1933, brought forward		$0,000 00
Appropriations for current year		108,890 00
Total		$108,890 00
Expended during the year (see statement below)	$27,617 22	
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*	27,617 22
Balance November 30, 1934, carried to next year		$81,272 78

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Sprinklers	1934 Ch. 162	$3,600 00	5 55	$5 55	$3,594 45
Sewer Connections	Ch. 162	60,790 00	–	–	60,790 00
Emergency Public Works Commission-Construction Mass. State Projects–					
Docket 1354-H-2 "Reconstruction Sewer Lines"	–	7,500 00	6,471 12	6,471 12	1,028 88
Docket 2275-H-3 "New Boilers"	–	37,000 00	21,140 55	21,140 55	15,859 45
Totals	–	$108,890 00	$27,617 22	$27,617 22	$81,272 78

Per Capita

During the year the average number of patients has been		352 08
Total cost of maintenance	$272,710 91	
Equal to a weekly per capita cost of (52 weeks to year)	14 89	
Total receipts for the year	192,095 71	
Equal to a weekly per capita of	10 49	
Total net cost of maintenance for year (total maintenance less total receipts)		$80,615 20
Net weekly per capita	4.40	

Respectfully submitted,

MARY A. BOYLE,

Treasurer.

Inventory: Rutland State Sanatorium

GRAND SUMMARY SHEET

November 30, 1934

Real Estate

Land, 364.727 acres	$12,575 00	
Buildings	675,623 09	
Betterments (additions and improvements)	163,504 12	
Total, Real Estate		$851,702 21

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$430 87	
Food	4,227 10	
Clothing and materials	824 38	
Furnishings and household supplies	2,035 01	
Medical and general care	2,975 85	
Heat, light and power	5,097 70	
Farm	3,878 91	
Garage, stable and grounds	99 39	
Repairs	3,937 58	
		$23,506 79

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$1,442 97	
Clothing and materials	129 83	
Furnishings and household supplies	33,044 42	
Medical and general care	10,439 92	
Heat, light and power		
Farm	29,849 50	
Garage, stable and grounds	713 35	
Repairs	1,287 92	
Total		$76,907 91

GRAND SUMMARY

Real Estate—Total	$851,702 21	
Personal Property—Undistributed Supplies, Total	23,506 79	
Personal Property—Distributed Supplies, Total	76,907 91	
		$952,116 91

WESTFIELD STATE SANATORIUM

RESIDENT OFFICERS

ROY MORGAN, M.D., *Superintendent.*
HEMAN B. CHASE, M.D., *Assistant Superintendent.*
BERNARD GOLDBLATT, M.D., *Senior Physician.*
ELIOT H. LUTHER, M.D., *Senior Physician.*
HOWARD W. NEWELL, M.D., *Assistant Physician*
CHARLES E. GILL, M.D., *Assistant Physician.*
GEORGE E. CROWELL, D.M.D., *Dentist.*
BESSIE MACDONALD, R.N., *Superintendent of Nurses and Matron.*
JOSEPHINE E. FRENCH, *Treasurer.*
JOHN E. KINSELLA, *Steward.*
BENJAMIN J. SANDIFORD, *Chief Engineer.*
WILLIAM G. ATKINSON, *Head Farmer.*

NON-RESIDENT OFFICERS

*MARSHALL M. MENZIES, M.D., *Consultant in Diseases of the Eyes, Ears, Nose and Throat.*
*JOHN PALLO, M.D., *Consultant in Diseases of the Eyes, Ears, Nose and Throat.*
A. D. ROOD, M.D., *Consultant in Bronchoscopy.*

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* Six months each.

Report of the Superintendent

To HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-fifth annual report of the Westfield State Sanatorium for the year ending November 30, 1934.

FINANCIAL STATEMENT

During the year there has been expended $228,374.24 for maintenance, a gross weekly per capita cost of $18.04. There has been expended from Special Appropriation—P.W.A. Docket No. 1354-H-4 for Filter Beds—$6,767.57.

There has been collected from miscellaneous sources (the total of all collections) $77,562.62. Deducting this amount from the gross maintenance expense leaves a net expense of $150,811.62, a net weekly per capita cost of $11.91. There has been collected from private sources $2,158.00; from cities and towns $73,309.00.

Four cases were supported wholly or in part from private funds; 98 cases by cities and towns; 21 wholly by the State, and 9 by the Department of Public Welfare, Division of Child Guardianship. There were 18 cases on which settlements had not been determined.

Population

There were 242 patients in the sanatorium at the beginning of the year and 218 at the close. The largest number of patients at any one time was 268 and the smallest number 212. The daily average number of patients was 243.5. There were 150 patients admitted during the year and 174 were discharged. Seventy-one cases were admitted from cities and towns of over 25,000 population and 79 from cities and towns of less than 25,000. The average age of patients was 10.5 years. The average length of stay of patients discharged, including deaths, was 570.24 days. Of the 174 discharged cases, 22 were apparently well, 102 apparently arrested, 21 improved, 21 unimproved, 1 quiescent and 7 deaths. Of the discharged patients, 160 gained 3,174 pounds. Hospital days of patients was 88,876. The average number of employees and officers during the year was 145.

Medical Report

Our medical treatment has not changed during the year, except that we are using collapse therapy more than ever. Artificial pneumothorax has been used in 38 cases, 650 injections being given. Pneumolysis was performed on 1 case; thoracoplasty on 1; and thoracoscopy on 1. We have also continued treatment on 16 cases discharged from Rutland, 198 injections being given to these cases.

During the year we have had the following cases of contagious diseases: measles 26, scarlet fever 1, and whooping cough 2. The measles cases were remarkably mild, due apparently to the prophylactic use of Normal Human Serum and Placental Extract.

The consultation clinics at Great Barrington and Greenfield have been continued. In addition, a monthly clinic was opened in North Adams during the year.

Our out-patient work again shows an increase over the previous year. This service has come to be one of our major activities and it is being utilized by the physicians within a radius of 30 to 50 miles.

The figures for these activities are shown in the following tables:

	Negative		Suspicious		Positive		Total
	New	Re-exam	New	Re-exam	New	Re-exam	
Consultation	595	74	84	9	18	127	907
Out-Patient	1,174	299	233	121	129	315	2,271

We have continued furnishing medical service to the Hampden County Tuberculosis Association in their County Clinics and have also furnished medical service for their Summer Camp. Tuberculin tests were given to the children in the Camp, followed by X-ray and physical examination wherever indicated. In the schools, 1,730 tuberculin tests were given in 13 cities and towns, followed by 690 chest films and 319 physical examinations.

The tuberculosis case-finding work among the school-age population, until the present school year carried on by the Chadwick Clinics of the State Department of Public Health, has been continued in Berkshire, Franklin, and Hampden counties by the staff of this institution. During the first three months of the current school year (September, October and November), tuberculin testing was done in the public and parochial schools of forty-five towns and cities of these three counties. Of the eighty-one towns and cities in the three counties, only seven have thus far withheld their formal approval for this work to be continued in their communities. Tuberculin-testing was done on 5,705 children among the 13,653 enrolled in the grades tested, a consent response of 42 per cent. On the basis of the work done in thirty-one towns and cities where the surveys are complete in every detail, the reaction-rate was 15 per cent, with a range of 0-28 per cent. A total of 1,778 X-ray films of the chest were taken, this figure including 680 films taken of children on the follow-up list of the Chadwick Clinics. Physical examinations to the number of fifty-nine have been completed in thirty-one communities. The findings were as follows: adult-type pulmonary cases, 1; adult-type pulmonary observation cases, 2; childhood-type pulmonary cases, 28; childhood-type pulmonary observation cases, 20. Final and individual reports have been prepared and forwarded to our co-workers in 31 communities, and 14 reports are held pending the completion of the field work in those communities.

Twenty lectures on tuberculosis have been given by members of the staff during the year before various Parent-Teacher Associations and Womens' Clubs in Springfield and vicinity, and one lecture was given before the University Club of Springfield.

Institution Activities

The regular annual meeting of the Western Massachusetts Health Officials was held at the Institution on May 28th. Lectures and demonstrations on childhood tuberculosis were given on January 11th and January 18th to a special class of the Harvard School of Public Health, and on October 17th to the Mother's Council of Springfield.

Personnel Changes

Dr. J. Ernest Landry resigned on May 1, 1934, after six years of service. His place was taken by Dr. Howard Newell. Dr. Charles Gill came to us on August 1st to take charge of the new School Clinic work, and Miss Mary Hatton was employed on August 1st to handle the clerical work of the school clinics. Dr. Gill and Miss Hatton were both transferred to us from the Chadwick Clinic. Otherwise, there has been no important change in our personnel.

Improvements and Changes

The riser column of our water tank has been rebuilt and a new circulating pipe installed. The wells were washed out and a new water main was laid to the Engineer's Cottage. Partly by Federal aid, considerable underbrush was cleared from the grounds, the coal trestle was repaired and four new filter beds were constructed. All other improvements have been of a minor nature.

Recommendations

Our staff dining room is very crowded and should be enlarged. A request for $1,500 for this purpose is included in our budget. The two small boilers should be equipped with automatic stokers. For this, an item of $4,200 has been included in the budget.

A special appropriation of $8,085 has been requested for certain improvements in water supply and fire protection. This has been approved by the Engineering Division.

Acknowledgments

I am deeply indebted to our clergymen and to the entire personnel of the institution for their loyal and efficient support during the year. I also wish to thank you and the other members of the Department for your support and cooperation.

Surgical Report

The following operations have been performed at the sanatorium: Tonsillectomy and adenectomy, 13; artificial pneumothorax treatments, 848; and thoracentesis, 3.

The following were done at the Massachusetts General Hospital: Pneumolysis, 1; thoracoplasty, 1; and thoracoscopy, 1.

The following was done at the Noble Hospital in Westfield: Mastoidectomy, 1.

The following was done at the Shrine Hospital in Springfield: Excision of accessory bones of feet, 1.

Laboratory Report

Urine examinations, 442; sputum examinations, 162; blood counts, 205; animal inoculations, 28; bleeding and clotting time, 9; blood culture, 1; sputum culture, 3.

Dental Report

The following table shows the work done in the dental clinic during the year: Prophylactic treatments, 410; fillings—permanent teeth, 1,251; fillings—temporary teeth, 119; extractions—permanent teeth, 125; extractions—temporary teeth, 102; treatments, 27; restorations, 3; X-rays, 10; surgical extractions, 5; examinations, 921; root canal treatments completed, 2. Total, 2,975.

Office and bedside visits, 1,673; dismissals, 377.

SCHOOL REPORT

Average daily attendance from December 1, 1933, to November 30, 1934:

Grade I	21.43	Grade VI	16.80
Grade II	15.95	Grade VII	13.90
Grade III	14.96	Grade VIII	12.01
Grade IV	19.01	Manual Training	13.07
Grade V	23.02		

Total average attendance	150.15
Total enrollment	275.

Respectfully submitted,
ROY MORGAN, M.D.
Superintendent.

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in sanatorium November 30, 1933	117	125	242
Patients admitted December 1, 1933, to November 30, 1934, inclusive	74	76	150
Patients discharged December 1, 1933, to November 30, 1934, inclusive	90	84	174
Deaths (included in number discharged	2	5	7
Patients remaining in sanatorium November 30, 1934	101	117	218
Daily average number of patients	115.00	128.5	243.5

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1933	1934	1933	1934	1933	1934
Advanced	6	3	10	7	7.14	4.67
Asthma	–	–	1	–	.71	–
Bronchiectasis	–	–	–	2	–	1.33
Cervical adenitis	–	–	2	–	1.42	–
Childhood tuberculosis	81	102	84	97	60.00	64.67
Childhood tuberculosis,abdominal	–	–	–	1	–	.66
Childhood type (pulmonary)	–	–	–	5	–	3.33
Chronic otitis media	–	–	–	1	–	.66
Diabetes	–	–	1	–	.71	–
Malnutrition	–	–	9	12	6.44	8.00
Miliary tuberculosis	–	1	–	1	–	.66
Minimal	24	17	8	6	5.71	4.00
Moderately advanced	14	13	14	7	10.00	4.67
No disease	–	–	4	5	2.87	3.33
Non pulmonary	–	1	–	–	–	–
Osteomyelitis	–	1	–	–	–	–
Pott's disease	–	–	1	–	.71	–
Pleurisy with effusion	1	–	1	1	.71	.67
Pulmonary abscess	–	–	1	–	.71	–
Tabes mesenterica	–	1	–	–	–	–
Tuberculosis of left elbow	–	–	–	1	–	.67
Tuberculous laryngitis	1	–	–	–	–	–
Tuberculosis of the spine	–	–	–	1	–	.67
Tuberculous mesenteric glands	–	–	–	1	–	.67
Tuberculous peritoneal glands	–	–	–	1	–	.67
Unclassified	13	11	4	1	2.87	.67
	140	150	140	150	100.00	100.00

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	74	76	150

TABLE 4.—*Ages of Patients Admitted*

	Males	Females	Totals	Percentages
Under 5 years	4	3	7	4.7
5 to 9 years	29	32	61	40.6
10 to 14 years	26	27	53	35.3
15 to 19 years	15	13	28	18.7
20 years and over	0	1	1	.7
	74	76	150	100.00

Average age 10.5 years.

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	63	26	30	67	25	21	130	51	51
Other New England States	8	8	11	4	10	18	12	18	29
Other States	2	8	3	4	5	6	6	13	9
Total Native	73	42	44	75	40	45	148	82	89
Foreign Countries:									
Albania	0	0	0	0	1	1	0	1	1
Austria	0	1	0	0	0	0	0	1	0
Canada	0	14	11	0	9	8	0	23	19
England	1	1	2	1	2	3	2	3	5
Greece	0	0	0	0	3	2	0	3	2
Holland	0	1	1	0	0	0	0	1	1
Ireland	0	1	2	0	2	3	0	3	5
Italy	0	5	4	0	7	4	0	12	8
Lithuania	0	1	1	0	1	1	0	2	2
Newfoundland	0	0	1	0	0	0	0	0	1
Poland	0	5	4	0	7	7	0	12	11
Portugal	0	0	0	0	1	1	0	1	1
Russia	0	1	1	0	0	0	0	1	1
Scotland	0	1	2	0	0	1	0	1	3
Total, Foreign	1	31	29	1	33	31	2	64	60
Unknown	0	1	1	0	3	0	0	4	1
Total	1	32	30	1	36	31	2	68	61
Total Native	73	42	44	75	40	45	148	82	89
Grand Total	74	74	74	76	76	76	150	150	150

TABLE 6.—*Residence of Patients Admitted*

Adams	3	Enfield	1	Malden	2	Somerville	2
Amherst	1	Fitchburg	16	Melrose	1	Southborough	1
Arlington	1	Franklin	1	Milford	2	Southbridge	2
Ashland	3	Gardner	3	Natick	3	Spencer	1
Athol	14	Golden Bridge, N.Y.	1	Newton	2	Springfield	14
Auburn	1	Grafton	2	North Adams	1	Sturbridge	3
Boston	5	Granville	1	Northampton	1	Sutton	1
Brockton	1	Holden	2	Northboro	1	Taunton	1
Brookfield	1	Holyoke	12	Northbridge	1	Uxbridge	1
Canton	1	Hopkinton	1	Orange	2	West Boylston	1
Chicopee	4	Hudson	1	Pittsfield	6	West Bridgewater	1
Clinton	2	Lenox	1	Revere	1	Worcester	4
Deerfield	1	Leominster	5	Rutland	3		
Easthampton	3	Ludlow	2	Shirley	1	Total	150
East Longmeadow	1						

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Advanced	2	5	7	4.67
Bronchiectasis	1	1	2	1.33
Childhood tuberculosis	49	48	97	64.67
Childhood tuberculosis (abdominal)	0	1	1	.66
Childhood type (pulmonary)	1	4	5	3.33
Chronic otitis media	1	0	1	.66
Malnutrition	6	6	12	8.00
Miliary tuberculosis	0	1	1	.66
Minimal	3	3	6	4.00
Moderately advanced	4	3	7	4.67
No disease	3	2	5	3.33
Pleurisy with effusion	1	0	1	.67
Tuberculosis of left elbow	1	0	1	.67
Tuberculosis of the spine	1	0	1	.67
Tuberculous mesenteric glands	0	1	1	.67
Tuberculous peritoneal glands	1	0	1	.67
Unclassified	0	1	1	.67
	74	76	150	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	53	49	102	58.62
Apparently well	10	12	22	12.64
Died	2	5	7	4.02
Improved	11	10	21	12.07
Unimproved	14	7	21	12.07
Quiescent	0	1	1	.58
	90	84	174	100.00

TABLE 9.—*Deaths, by Length of Residence, at Sanatorium*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM Males	Females	Totals
Under 1 month	0	0	0	0	1	1
5 to 6 months	0	1	1	0	0	0
10 to 12 months	0	0	0	1	0	1
12 to 18 months	0	0	0	0	1	1
18 to 24 months	0	2	2	1	2	3
Over 2 years	2	2	4	0	1	1
	2	5	7	2	5	7

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	2	5	7

Financial Report, Westfield State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

STATEMENT OF EARNINGS

Board of patients:			
Private	$1,110 00		
Cities and towns	68,737 00		
		$69,847 00	
Personal services:			
Reimbursement from Board of Retirement		$103 00	
Sales:			
Food	$78 59		
Clothing and materials	560 26		
Furniture and household supplies	7 00		
Medical and general care	83 25		
Heat, light and power	5 99		
Farm	1,011 95		
Garage, stable and grounds	3 75		
Arts and crafts sales	240 94		
Total sales		$1,991 73	
Miscellaneous:			
Patronage dividend	$ .89		
Total, miscellaneous		$ .89	
Total earnings for the year			$71,942 62
Total cash receipts reverting and transferred to the State Treasurer			$77,562 62
Accounts receivable outstanding Dec. 1, 1933		$23,832 50	
Accounts receivable outstanding Nov. 30, 1934	18,212 50		
Accounts receivable decreased			$5,620 00

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$4,554 26
Appropriation, current year	$229,990 00	
Supplementary budget	2,600 00	
For salary adjustment	3,462 00	
		236,052 00
Total		$240,606 26
Expenditures as follows:		
Personal services	$142,336 43	
Food	29,006 85	
Medical and general care	6,334 03	
Farm	10,079 15	
Heat, light and power	15,918 52	
Garage, stable and grounds	2,186 46	
Travel, transportation and office expenses	4,205 16	
Religious instruction	987 95	
Clothing and materials	3,708 26	
Furnishings and household supplies	5,806 04	
Repairs, ordinary	4,118 03	
Repairs and renewals	3,689 88	
Total maintenance expenditures		$228,376 76
Balance of maintenance appropriation, Nov. 30, 1934		12,229 49
Estimated outstanding liabilities, Nov. 30, 1934		$7,572 34

SPECIAL APPROPRIATIONS

Balance December 1, 1933, brought forward		
Appropriations for current year		$8,000 00
Total		$8,000 00
Expended during the year (see statement below)	$6,767 57	
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*	
Balance November 30, 1934, carried to next year		$1,232 43

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at end of Year
$8,000 00 P.W.A. Docket No. 1354 Mass. State Project H-4	1934	$8,000 00	$6,767 57	$6,767 57	$1,232 43

PER CAPITA

During the year the average number of patients has been		243.5
Total cost of maintenance	$228,376 76	
Equal to a weekly per capita cost of (52 weeks to year)	18.036	
Total receipts for the year	77,562 62	
Equal to a weekly per capita of	6.125	
Total net cost of maintenance for year (total maintenance less total receipts)		$150,811 62
Net weekly per capita	11.91	

Respectfully submitted,
JOSEPHINE E. FRENCH,
Treasurer.

Inventory: Westfield State Sanatorium

GRAND SUMMARY SHEET

November 30, 1934

REAL ESTATE

Land, 263.06 acres	$11,021 00	
Buildings	420,980 58	
Betterments (additions and improvements)	11,556 31	
Total, Real Estate		$443,557 89

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$100 00	
Food	3,797 39	
Clothing and materials	3,780 67	
Furnishings and household supplies	2,875 97	
Medical and general care	780 88	
Heat, light and power	1,059 50	
Farm	1,830 70	
Garage, stable and grounds	107 35	
Repairs	12 63	
		$14,345 09

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$3,774 51	
Clothing and materials	732 28	
Furnishings and household supplies	39,388 67	
Medical and general care	43,493 63	
Heat, light and power	4,129 88	
Farm	31,685 92	
Garage, stable and grounds	8,006 90	
Repairs	2,771 61	
Total		$133,983 40

GRAND SUMMARY

Real Estate—Total	$443,557 89	
Personal Property—Undistributed supplies, Total	14,345 09	
Personal Property—Distributed supplies, Total	133,983 40	
		$591,886 38

PONDVILLE HOSPITAL

Resident Officers

George L. Parker, M.D., *Superintendent.*
Raymond E. Militzer, M.D., *Assistant Superintendent.*
George L. MacKinnon, M.D., *Assistant Physician.*
William H. Roper, M.D., *Assistant Physician.*
Ira T. Nathanson, M.D., *Assistant Physician.*
Jesse Parker, M.D., *Assistant Physician.*
Matthew J. Bachulus, M.D., *Assistant Physician.*
Cecil Krakower, M.D., *Pathologist.*
Dorothy Z. Silver, R.N., *Principal of School of Nursing.*
Marion MacKenzie, *Treasurer.*
Neil Fountain, *Head Social Service Worker.*
Florence Mullen, *Head Housekeeper.*
Ernest L. Gage, *Chief Power Plant Engineer.*
Daniel Donovan, *Groundskeeper.*
Eleanor Upham, *Dietitian.*
John Lang, *Carpenter.*

Non-Resident Officers

Ernest M. Daland, M.D., *Surgeon and Chief.*
Grantley W. Taylor, M.D., *Surgeon.*
Horatio Rogers, M.D., *Surgeon.*
Richard H. Wallace, M.D., *Assistant Surgeon.*
Valmore A. Pelletier, M.D., *Assistant Surgeon, OPD.*
Joe Vincent Meigs, M.D., *Gynecologist.*
Langdon Parsons, M.D., *Assistant Gynecologist.*
Roger C. Graves, M.D., *Urologist.*
Charles J. E. Kickham, M.D., *Assistant Urologist.*
John S. Hodgson, M.D., *Neurological Surgeon.*
Richard H. Norton, D.M.D., *Oral Surgeon.*
Carl Ernlund, M.D., *Laryngologist.*
Henry Jackson, Jr., M.D., *Physician.*
Dudley Merrill, M.D., *Assistant Physician.*
Maxwell Finland, M.D., *Assistant Physician.*
Arthur W. Greenwood, M.D., *Dermatologist.*
Hugo B. C. Riemer, M.D., *Opthalmologist.*
Richard Dresser, M.D., *Roentgenologist.*
Charles A. Dumas, M.D., *Assistant Roentgenologist.*
Harry W. Harding, D.M.D., *Dentist.*
James C. Hudson, Ph.D., *Physicist.*
Shields Warren, M.D., *Pathologist.*
F. H. L. Taylor, Ph.D., *Physiological Chemist.*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the eighth annual report of the Pondville Hospital (Norfolk), P. O. Wrentham, Massachusetts, for the year ending November 30, 1934.

Population

There were 102 patients in the hospital on November 30, 1933. During the year, there were 1,222 admissions. Of these 398 represented readmissions. Patients were received from 167 towns and cities. Patients were also received from 9 other State Institutions. Ninety-six patients remained in the hospital at the end of the year.

Discharges during the year numbered 1,228. The condition of 177 was the same, 768 improved and 283 died. There were 173 autopsies.

The average period of hospitalization was 33.78 days. The smallest number in the hospital on any one day was 83; the largest number, 121. The average number of patients per day was 110.3.

The daily average number of officers and employees was 134.3.

Medical Report

During the year there has been considerable increase in the work of all hospital departments. This has necessitated the addition of three head nurses and one physician to our resident staff. The number of hospital admissions has increased 2 per cent over the previous year. The average length of hospitalization has been reduced from 37.14 days to 33.78 days. This rapid turnover has caused considerable reduction in our waiting list. The number of operations has increased 14 per cent and the number of surgical specimens handled by the pathological departments has increased proportionally. Autopsies have increased 12 per cent while the number of deaths has increased 11 per cent.

The weekly clinics at the hospital were continued through the year with 49 clinics held. Visits to the regular Thursday clinic numbered 2,736 with an average attendance of 56. Patients making their first visit to the clinic numbered 954. Outpatient visits, other than the regular Thursday clinic, numbered 1,883. Of these, 165 were new patients. The total clinic visits were 4,619. There were 381 clinic patients who subsequently were admitted to the hospital.

During the early part of the year, an epidemic of scarlet fever occurred among our patients. There were seven patients transferred to the contagious department of the Haynes Memorial Hospital in Brighton. One patient died from postoperative scarlet fever at Pondville. Throat cultures were taken of our employees. Tonsillectomies and adenoidectomies were done at the hospital on five employees having positive throat cultures and diseased tonsils and adenoids. Several employees with positive throat cultures were given leave of absence until cultures were negative. Those nurses having a positive Dick were immunized for scarlet fever and were given convalescent serum, and eight were immunized with scarlet fever toxoid.

X-ray and Radium:

Diagnostic X-ray plates taken, 3,089; fluoroscopic examinations, 504; X-ray treatments given, 3,822; radium treatments given, 541.

Surgical Report

Operations: Major, 427; minor, 662; biopsies, 427; esophagoscopies, 4; laryngoscopy, 1; cystoscopies, 184; proctoscopies, 65; bronchoscopies, 7; urethroscopy, 1.

An anesthetic was given 1,165 times.

Laboratory Report

Surgical specimens, 1,143; frozen sections, 89; laboratory tests, 17,686.

Dental Report

Prophylactic treatments, 123; extractions (permanent teeth), 999; treatments, 316; x-ray examinations, 129; examinations, 715. Total, 2,282. Total number of visits, 1,186; total number of new patients, 715; total number of dismissals, 319.

Institutional Activities

In addition to the staff meetings, the following programs consisting of clinics and meetings were held at the hospital:

April 11—State-wide Cancer Clinic.
June 25—Cancer Clinic Workers.
October 16 and October 19—Special Clinics—American College of Surgeons.
November 7—Massachusetts Cancer Education Committees.

Through the courtesy and cooperation of our clergy, numerous musical programs by choirs and local brass bands were rendered for the patients.

Good fellowship among the employees has been stimulated by the activities of our local baseball team, tennis matches, motion pictures and dances. Through the courtesy of the superintendent of the Wrentham State School, our employees have utilized the bowling alleys of that institution weekly.

Personnel Changes

The following additions and changes were made during the year: Dr. George M. Sullivan resigned as superintendent and his position was filled by the present superintendent. Dr. Cecil Krakower was appointed resident pathologist to succeed Dr. Theodore P. Eberhard, resigned. Dr. Jesse Parker and Dr. Ira Nathanson were appointed assistant physicians to succeed Dr. Henry Clarke and Dr. Thomas Anglem, resigned. Dr. Matthew Bachulus was appointed assistant physician. Miss

Leola Ames was appointed assistant social worker to succeed Mrs. Myrtle Roberson, resigned. Mrs. Florence Mullen was appointed head housekeeper to succeed Mrs. Mae Donovan who resigned from that position because of ill health. Miss Gertrude McGuane was transferred from the social service department to the business office to succeed Mrs. Zeliah Leland, resigned. Miss Olive McAndrew was transferred to the business office to fill the additional position of junior clerk and stenographer in that department. Miss Thelma Locke and Miss Ann Broe were appointed as junior clerks and stenographers to fill the vacancies in the social service department caused by the transfers. Miss Alberta Potter was appointed pathological laboratory technician to succeed Miss Bettina Blunt, resigned.

Improvements and Changes

Following are the improvements and changes made during the year:

CWA projects consisted of the recovering with asbestos of the steam lines from the power house to the hospital buildings and the removal of dead brush from the hospital property adjacent to the employees' cottages.

Through the cooperation of the Public Works Department plans were formulated for a new entrance and a road from the main highway to the administration building and enlargement of the automobile parking space. From FERA funds and the material obtained from the excavation of our new buildings, the foundations have been laid for both of these projects.

A new road has been developed in front of the superintendent's house.

Changes in the administration building were as follows:

Relocation and enlargement of the medical record office.

The business office and treasurer's office were relocated and enlarged.

Removal of the chemical laboratory to larger quarters in the basement in the north hospital wing and enlargement of the pathological laboratory.

Relocation of superintendent's office.

A centrally located waiting room for the patients' relatives has been established on the main floor of the administration building.

A public telephone pay station has been more conveniently located.

Provision has been made for a future bacteriological laboratory.

The connecting porches between the administration building and the north and south wings have been glassed in.

The linen and sewing rooms have been moved to larger quarters and the chief engineer's office has been relocated.

The superintendent's house has been renovated and weather-stripped.

Recommendations

Following the completion of our two new buildings in the spring, the regrading and reseeding of our lawns will be necessary. In order to prevent the obstruction of our surface drainage system, a cement retaining wall should be put in the rear of the new service building. Winter protection for patients occupying the new building will necessitate the glassing-in of the porches.

It is earnestly hoped that the deplorable condition of our roads and sidewalks may be rectified this next year and that adequate lighting facilities may be provided at our road entrances and in the new parking space.

The housing accommodations for our employees have not expanded with the hospital and following the completion of our new buildings this will be a serious problem. A 100-bed dormitory would solve our immediate housing problem and would allow us to demolish the "white house" which is in poor condition and a serious fire hazard.

Our incinerator accommodations are inadequate and objectionally located and I strongly recommend the installation of suitable equipment in a proper location.

A fire hazard in the employees' cottages would be eliminated by locating stationary ironing equipment in the basement of each cottage.

Because of the addition of beds to our hospital, it is advisable to add two junior clerks and stenographers to our medical record staff.

It is advisable to enlarge our necropsy room and add another physician to our pathological department because of increased work in that department.

The pharmacy should be relocated in order to provide extra bed space in Ward A.

Our present garage accommodates only a few cars and I recommend that a larger garage be built to provide space for the many cars owned by employees which are now scattered about the grounds.

ACKNOWLEDGMENTS

I wish to express my appreciation to the Reverend Father Mitchell and his assistants and to the Reverend Mr. Shafer for their cooperation and good work in ministering to the spiritual needs of our patients.

To the members of the Social Service Committee and to the Ladies' Society of the Wrentham Congregational Church who have given so freely of their time and resources in maintaining the happiness of our patients, I am deeply indebted.

I wish to thank the Tabernacle Society, Convent of Notre Dame, for the vestments which they made and donated to the hospital.

To the American Legion Band of Norwood, the Franklin and North Attleboro Bands and the numerous groups of choir singers who have rendered musical programs for our patients, I am deeply grateful.

I wish to express my appreciation to the members of the Public Works Department for their splendid cooperation in developing our new road and parking space.

I am deeply grateful for the support, cooperation and loyalty given me by the medical staff, the nurses and all other employees.

I wish to express my sincere appreciation to the Director and other members of the Department for their assistance through the year.

Respectfully submitted,

GEORGE L. PARKER, M.D.
Superintendent.

Statistical Tables

The following tables are based on the number of new patients admitted.

TABLE 1—*Admissions and Discharges*

	Males	Females	Totals
Patients in hospital December 1, 1933	58	44	102
Patients admitted from December 1, 1933, to November 30, 1934, inclusive	590	632	1,222
Patients discharged from December 1, 1933, to November 30, 1934, inclusive	593	635	1,228
Patients remaining in hospital November 30, 1934	55	41	96
Daily average number of patients	59 89	50 41	110 30
Deaths (included in number discharged)	177	106	283

TABLE 2.—*Readmissions*

	Males	Females	Totals
Total patients treated	648	676	1,324
Less old patients readmitted first time since December 1, 1933	66	95	161
Less other readmissions	126	111	237
Less patients in hospital December 1, 1933	58	44	102
Number new patients admitted from December 1, 1933, to November 30, 1934	398	426	824
Total number different patients treated December 1, 1933, to November 30, 1934	522	565	1,087

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	63	55	118
Married	221	248	469
Widowed	107	112	219
Divorced	5	8	13
Separated	2	3	5
Total	398	426	824

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Totals
Under 20 years	7	5	12
20 to 29 years	7	9	16
30 to 39 years	11	59	70
40 to 49 years	36	107	143
50 to 59 years	99	99	198
60 to 69 years	125	95	220
70 to 79 years	89	46	135
80 to 89 years	22	5	27
90 to 99 years	2	1	3
Totals	398	426	824

TABLE 5.—*Nativity of Patients Admitted*

	Males	Females	Totals
United States	204	246	450
Armenia	1	4	5
Australia	1	–	1
Austria	1	1	2
Belgium	1	–	1
Canada	66	66	132
Czechoslovakia	–	1	1
Denmark	3	–	3
England	23	16	39
Finland	4	5	9
France	1	2	3
Germany	4	5	9
Greece	2	1	3
Ireland	35	26	61
Italy	15	17	32
Latvia	1	–	1
Lithuania	4	4	8
Poland	7	5	12
Portugal	5	8	13
Rumania	–	1	1
Russia	7	5	12
Scotland	7	2	9
Siam	–	1	1
Sweden	3	6	9
Switzerland	–	1	1
Syria	3	3	6
Totals	398	426	824

TABLE 6.—*Residence of Patients Admitted*

Abington	1
Adams	1
Agawam	1
Amesbury	4
Andover	1
Arlington	2
Ashburnham	2
Ashland	1
Athol	4
Attleboro	21
Auburn	1
Ayer	1
Barnstable	4
Bellingham	2
Belmont	1
Berlin	1
Beverly	1
Blackstone	1
Boston	64
Bourne	2
Braintree	5
Bridgewater	1
Brimfield	1
Brockton	41
Brookline	4
Cambridge	11
Canton	5
Carver	1
Charlton	2
Chelmsford	1
Chelsea	3
Chicopee	3
Colrain	1
Conway	1
Dalton	1
Dartmouth	4
Dedham	4
Dighton	3
E. Bridgewater	3
E. Longmeadow	1
Easton	1
Everett	4
Fairhaven	2
Fall River	14
Fitchburg	12
Foxborough	15
Framingham	3
Franklin	18
Freetown	1
Gardner	17
Gloucester	1
Gosnold	1
Grafton	2
Hanson	2
Harwich	1
Haverhill	2
Holbrook	1
Holliston	2
Holyoke	6
Hopedale	1
Hopkinton	1
Hubbardston	3
Lawrence	26
Leicester	2
Leominster	8
Lowell	22
Ludlow	2
Lunenburg	2
Lynn	12
Lynnfield	1
Malden	3
Mansfield	13
Marblehead	1
Marlborough	2
Marshfield	1
Medfield	3
Medford	4
Medway	6
Melrose	1
Mendon	1
Merrimac	2
Methuen	4
Middleborough	11
Milford	9
Millbury	3
Millville	1
Milton	1
Monson	1
Natick	2
New Bedford	27
Newburyport	2
Newton	1
Norfolk	3
North Adams	4
Northampton	6
North Andover	2
N. Attleborough	15
Northbridge	1
Northfield	2
Norton	4
Norwood	7
Oak Bluffs	2
Oakham	1
Orange	6
Oxford	4
Palmer	3
Peabody	1
Petersham	1
Pittsfield	3
Plainville	4
Plymouth	3
Plympton	1
Quincy	17
Randolph	3
Raynham	2
Rehoboth	2
Revere	4
Rochester	1
Rockland	3
Rockport	1
Royalston	1
Russell	2
Salem	2
Sandwich	1
Scituate	1
Seekonk	1
Sharon	4
Sherborn	1
Shrewsbury	2
Somerville	3
Southbridge	4
Springfield	37
Stoneham	1
Stoughton	6
Sunderland	1
Swansea	2
Taunton	30
Templeton	5
Tolland	1
Townsend	1
Tyngsborough	1
Upton	1
Uxbridge	3
Wakefield	1
Walpole	3
Waltham	3
Ware	1
Wareham	2
Warren	1
Watertown	3
Webster	3
Westborough	1
W. Bridgewater	1
Westfield	6
Westford	1
W. Springfield	5
Westwood	2
Weymouth	4
Whately	1
Whitman	5
Williamstown	1
Winchendon	3
Woburn	2
Worcester	26
Wrentham	7
Yarmouth	1
Salem Depot, N.H.	1
State Institutions	27

TABLE 7.—*Stage of Disease of Patients Admitted*

	Males	Females	Totals
Early	62	65	127
Moderately advanced	172	142	314
Advanced	129	110	239
Non-malignant	35	109	144
Totals	398	426	824

TABLE 8.—*Condition of Patients Discharged*

	Males	Females	Totals
Same	96	81	177
Improved	320	448	768
Totals	416	529	945

TABLE 9

This table includes all new cases treated, both house patients and out-patients. In some instances, the same patient has been counted twice or more times, according to the varying conditions presented.

	Males	Females	Totals
CARCINOMA			
Buccal cavity and pharynx:			
Buccal cavity	12	–	12
Cheek	7	–	7
Floor of mouth	4	–	4
Lip	55	1	56
Palate	4	–	4
Pharynx	3	–	3
Salivary gland	1	1	2
Tongue	26	3	29
Tonsil	9	–	9
	121	5	126
Digestive tract and peritoneum			
Anus	2	–	2
Bile duct	1	–	1
Cecum	3	1	4
Colon	1	5	6
Duodenum	2	–	2
Esophagus	11	3	14
Gall bladder	2	1	3
Liver	4	1	5
Pancreas	7	3	10
Rectum	36	17	53
Sigmoid	4	1	5
Stomach	17	7	24
	90	39	129
Respiratory system:			
Bronchus	4	1	5
Larynx	26	1	27
Lung	4	1	5
Nasopharynx	2	–	2
	36	3	39
Female Genital Organs:			
Cervix	–	98	98
Clitoris	–	1	1
Ovary	–	9	9
Uterus	–	18	18
Vulva	–	6	6
	–	132	132
Breast	3	119	122
Male Genito-Urinary Organs:			
Bladder	19	–	19
Kidney	6	–	6
Penis	3	–	3
Prostrate	35	–	35
Testicle	3	–	3
	66	–	66
Skin:			
Ear	9	3	12
Eyelid	4	2	6
Face	41	42	83
Nose	25	12	37
Scalp	1	2	3
Skin (other sites)	16	19	35
Temple	5	4	9
	101	84	185
Other or Unspecified Organs:			
Antrum	6	1	7
Bladder (female)	–	2	2
Kidney (female)	–	1	1
Neck (primary site unknown)	3	1	4
Parotid	1	2	3
Thyroid	3	3	6
Urethra (female)	–	1	1
Miscellaneous	3	1	4
	16	12	28

	Males	Females	Totals
LYMPHOBLASTOMA:			
Lymphoblastoma and Hodgkin's disease	10	13	23
Lymphatic leukemia	1	1	2
Myelogenous leukemia	1	–	1
Aleukemic leukemia	–	1	1
	12	15	27
ENDOTHELIOMA:			
Ilium	–	1	1
Lip	1	–	1
Lymph node	–	1	1
Scapula (soft tissue)	1	–	1
	2	2	4
SARCOMA:			
Fibrosarcoma:			
Breast	–	2	2
Humerus and femur	1	–	1
Interscapular region	1	–	1
Ovary	–	1	1
Prostrate	1	–	1
Thigh	1	1	2
Leiomyosarcoma:			
Uterus	–	1	1
Primary site unknown	–	1	1
Myxosarcoma:			
Ovary	–	1	1
Amelanotic malignant melanoma:			
Cheek	1	–	1
Foot	1	–	1
Malignant melanoma:			
Foot	1	–	1
Heel	–	1	1
Interscapular region	1	–	1
Neck	1	–	1
Temple	–	1	1
Thigh	1	–	1
Multiple myeloma	–	1	1
Osteogenic sarcoma:			
Femur	2	–	2
Ilium	–	1	1
Tibia	–	1	1
Sarcoma (type unknown:)			
Buttock	–	1	1
Femur	1	–	1
Leg	1	–	1
Retroperitoneal	1	1	2
Thigh	1	–	1
	16	14	30
OTHER MALIGNANCIES	3	2	5
NON-MALIGNANT TUMORS:			
Adenofibromas	–	5	5
Adenomas	3	1	4
Angiomas	–	1	1
Cysts	2	7	9
Cystadenomas	1	4	5
Fibroids	1	42	43
Fibromas	6	1	7
Fibromyomata	–	1	1
Giant-cell tumors (benign)	1	1	2
Hemangiomas	12	21	33
Lipomas	6	12	18
Neurofibromas	2	–	2
Osteochondromas	2	–	2
Osteomas	–	1	1
Papillomas	13	14	27
Polyps	15	39	54
Tumors (nature unknown)	2	6	8
Other non-malignant tumors	4	1	5
	70	157	227

TABLE 9—*Continued*

	Males	Females	Totals
RHEUMATIC DISEASES, NUTRITIONAL DISEASES, ETC.	25	69	94
DISEASES OF THE BLOOD AND BLOOD-MAKING ORGANS	10	8	18
DISEASES OF THE NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE:			
Nervous system	16	18	34
Organs of vision	3	4	7
Ear and mastoid process	1	1	2
	20	23	43
DISEASES OF THE CIRCULATORY SYSTEM:			
Circulatory system (general)	90	81	171
Lymphatic system	1	1	2
	91	82	173
DISEASES OF THE RESPIRATORY SYSTEM:			
Nasal fossae and annexae	2	1	3
Larynx	1	2	3
Bronchus	8	2	10
Lungs	97	40	137
Pleura	10	5	15
	118	50	168
DISEASES OF DIGESTIVE SYSTEM:			
Buccal cavity and annexae, pharynx and tonsils	34	24	58
Esophagus	1	1	2
Ulcer of stomach and duodenum	36	10	46
Stomach	13	5	18
Intestines	49	40	89
Liver	5	8	13
Gall bladder and biliary passages	12	36	48
Peritoneum	6	9	15
	156	133	289
DISEASES OF GENITO-URINARY SYSTEM:			
Kidneys and ureters	52	34	86
Bladder	7	19	26
Urethra, urinary abscesses, etc.	1	6	7
Prostate	32	–	32
Male genital organs	4	–	4
Female genital organs	–	182	182
Cysts of the ovary	–	12	12
Breast	–	40	40
	96	293	389
DISEASES OF THE SKIN AND THE CELLULAR TISSUE:			
Keloids	2	3	5
Keratoses	53	41	94
Sebaceous cysts	12	11	23
Verruca	4	12	16
Other diseases	10	15	25
	81	82	163
DISEASES OF THE BONES AND ORGANS OF LOCOMOTION	8	5	13
OTHER CONDITIONS	81	104	185
NO DISEASE	3	11	14
NO DIAGNOSIS	19	27	46

Financial Report, Pondville Hospital at Norfolk, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this Institution for the fiscal year ending November 30, 1934.

Statement of Earnings

Board of patients:			
Private	$24,689 46		
Cities and towns	52,324 50		
Out-patient department	1,153 50		
Accident cases	22 30		
		$78,189 76	
Personal services:			
Reimbursement from Board of Retirement		$71 00	
Sales:			
Food	$67 90		
Medical and general care	9 15		
Garage and grounds	126 00		
Repairs, ordinary	8 25		
Miscellaneous—junk	29 55		
Board, special nurses	83 00		
Total sales		$323 85	
Miscellaneous:			
Rents	$120 00		
Total, miscellaneous		$120 00	
Total earnings for the year			$78,704 61
Total cash receipts reverting and transferred to the State Treasurer			$100,076 66
Accounts receivable outstanding Dec. 1, 1933		$101,087 72	
Accounts receivable outstanding Nov. 30, 1934		79,715 67	
Accounts receivable decreased			$21,372 05

Maintenance Appropriation

Balance from previous year, brought forward		$575 56
Appropriation, current year:		
Radium	$8,500 00	
Other maintenance	228,527 00	
		$237,027 00
Total		$237,602 56
Expenditures as follows:		
Personal services	$129,257 77	
Food	34,157 00	
Medical and general care	17,671 91	
Heat, light and power	12,796 76	
Garage and grounds	1,402 48	
Travel, transportation and office expenses	8,660 38	
Religious instruction	1,106 70	
Clothing and materials	638 35	
Furnishings and household supplies	15,024 51	
Repairs, ordinary	1,852 19	
Repairs and renewals	2,697 25	
Radium	5,180 33	
Total maintenance expenditures		$230,445 63
Balance of maintenance appropriation, Nov. 30, 1934		$7,156 93
Estimated outstanding liabilities, Nov. 30, 1934		$2,703 24

Special Appropriations

Balance December 1, 1933, brought forward		None
Appropriations for current year:		
Special		$5,000 00
P.W.A.		284,825 00
Total		$289,825 00
Expended during the year (see statement below)	$69,942 15	
Reverting to Treasury of Commonwealth	* 46 43	
(Star balances below that are reverting)		69,988 58
Balance November 30, 1934, carried to next year		$219,836 42

Appropriation	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
X-ray machine and equipment	1934	$5,000 00	$4,953 57	$4,953 57	$46 43*
Massachusetts State Project H-6 P.W.A. Docket 4200	1934	87,425 00	20,839 95	20,839 95	66,585 05
Massachusetts State Project H-5 P.W.A. Docket 4476	1934	197,400 00	44,148 63	44,148 63	153,251 37

Estimated outstanding liabilities, November 30, 1934. P.W.A. projects $3 92

PER CAPITA

During the year the average number of patients has been		110.28
Total cost of maintenance	$230,445 63	
Equal to a weekly per capita cost of (52 weeks to year)	40 18	
Total receipts for the year	100,076 66	
Equal to a weekly per capita of	17 45	
Total net cost of maintenance for year (total maintenance less total receipts)		$130,368 97
Net weekly per capita	22 73	

Respectfully submitted,

MARION MACKENZIE,
Treasurer.

Inventory: Pondville Hospital at Norfolk

GRAND SUMMARY SHEET

November 30, 1934

REAL ESTATE

Land, 324.2 acres	$9,250 00	
Buildings	479,774 03	
Betterments (additions and improvements)	71,814 40	
Total, Real Estate	$560,838 43	
Less 3% depreciation on buildings	16,547 65	
		$544,290 78

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$1,201 28	
Food	1,809 15	
Clothing and materials	2,301 96	
Furnishings and household supplies	6,068 44	
Medical and general care	22,678 91	
Heat, light and power	4,754 30	
Garage, stable and grounds	111 32	
Repairs	5,823 31	
		$44,748 67

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$5,488 81	
Clothing and materials	1,337 54	
Furnishings and household supplies	53,655 48	
Medical and general care	54,673 81	
Garage, stable and grounds	8,073 14	
Repairs	4,169 51	
Total	$127,398 29	
Less 5% depreciation	6,369 91	
		$121,028 38

GRAND SUMMARY

Real Estate—Total	$544,290 78	
Personal Property—Undistributed Supplies, Total	44,748 67	
Personal Property—Distributed Supplies, Total	121,028 38	
		$710,067 83

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TWENTY-FIRST ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS

REPORT OF THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1935, the Department of Public Health was constituted as follows:

Commissioner of Public Health . . . . Henry D. Chadwick, M.D.

Public Health Council

Gordon Hutchins, 1937	Richard M. Smith, M.D., 1936
Francis H. Lally, M.D., 1936	Richard P. Strong, M.D., 1938
Sylvester E. Ryan, M.D., 1937	James L. Tighe, B.A.Sc., C.E., 1938

Regular monthly meetings of the Department have been held throughout the year. An additional meeting was held on the day following the regular August meeting of the Council, at which time the members attended funeral services for the late X. Henry Goodnough, for many years the Chief Engineer of the Department.

The Committee on Sanitary Engineering, composed of Mr. Tighe, Chairman, Mr. Hutchins and the Commissioner, has met each month prior to the regular meeting of the Council and submitted its recommendations on all matters of sanitary significance.

The Council has carried out duties imposed on it by the several laws and legislative acts and resolves, including the promulgation of rules and regulations governing the sterilization of secondhand material to be used in the manufacture of bedding, mattresses and upholstered furniture, and rules and regulations governing the manufacture, bottling and sale of certain non-alcoholic beverages; approval of regulations governing the display and sale of foods as adopted by the boards of health of Framingham and Cambridge; changes in the rules and regulations of the Board of Examiners of Plumbers; approval of plumbing regulations adopted by boards of health of several communities; granting of licenses for the conduct of dispensaries during the calendar year 1935; adoption of rules and regulations for the protection of water supplies; approval of appointments at the tuberculosis sanatoria, county and state; approval of contracts for construction and equipment of new buildings and changes at state sanatoria; approval of plans for an additional ward at the Middlesex County Sanatorium; disapproval of plans for the use of a section of the Nurses' Home of the Fall River General Hospital as a ward for the care of contagious cases; and twelve hearings were held as provided by statute on the approval of taking of land for the protection of water supplies, the approval of plans for water supply and sewage disposal systems and on appeals from the action of local milk inspectors in refusing to grant licenses to certain dealers.

At a meeting of the Department on January 14, 1936, the Commissioner of Public Health presented to the Council a report of the doings of the Department for the year 1935, and after discussion it was voted that this report, together with the foregoing brief summary of the activities of the Public Health Council, be approved and adopted as the report of the Department of Public Health for the year 1935.

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TWENTY-FIRST ANNUAL REPORT OF THE COMMISSIONER OF PUBLIC HEALTH

To the Public Health Council:

Gentlemen: I have the honor to submit herewith my annual report for the fiscal year ending November 30, 1935, although, as in the past, all figures except those relating to the budget will be given for the calendar year.

I. General Matters

This has been an unusually busy year as besides the usual activities in the Department the Legislature passed four resolves creating commissions which called for participation with other Departments in special investigations. Chapter 28 called upon the Commissioners of Conservation and Public Health to make an investigation relative to the development of Cedar Swamp Pond in Milford for recreational purposes. Chapter 30 required the Commissioners of Conservation and Public Health to investigate the desirability of acquiring certain islands in Salem Bay for public purposes. Chapter 33 required the Commissioners of Correction, Mental Diseases and Public Health to make an investigation relative to establishing a system of public clinics, hospitals, etc., for the treatment of intoxicated persons. Chapter 42 directed the Commissioner of Public Works, the Commissioner of Public Health, the Metropolitan District Commission, the Health Commissioner of Boston, and the Commissioner of Public Works of Boston to investigate the discharge of sewage into Boston Harbor. These studies have been made and reports filed with the Clerk of the House. With regard to the investigation of the pollution of Boston Harbor, the Commission found that this study should be continued throughout the different seasons of the year before making any recommendations for the solution of this problem, and requested an extension of time.

In addition, a special commission established by legislative resolve, Chapter 11, was appointed by His Excellency the Governor, consisting of the Commissioners of Mental Diseases and Public Health and ten other members, to make a study of public health laws and practices of the Commonwealth, to recodify the existing laws that apply to public health, and make recommendations for further legislation if thought desirable. The Commonwealth Fund of New York generously made a grant of $10,000 to finance this study. The Commission, consisting of the following members: Dr. Henry D. Chadwick, Dr. Winfred Overholser, Dr. Charles E. Mongan, Professor Curtis M. Hilliard, Professor Wilson G. Smillie, Dr. Alexander S. Begg, Professor Samuel C. Prescott, Dr. Dwight O'Hara, Dr. David D. Scannell, Dr. Francis X. Mahoney, Dr. Charles F. Wilinsky, and Dr. Gerardo M. Balboni, organized in October and appointed committees to study fourteen different special problems. These were: (1) Codification of public health laws, (2) Public health practices and procedures, (3) Acute communicable disease control, (4) Public sanitation, (5) Maternal and infant hygiene, (6) Child hygiene, (7) Social hygiene and gonorrhea and syphilis control, (8) Hospitals, dispensaries, clinics and health centers for medical service to indigents, (9) Mental hygiene, (10) Tuberculosis control, (11) Occupational hygiene, (12) Adult hygiene and special medical problems, such as cancer, chronic rheumatism, diabetes and heart disease, (13) Public health nursing, and (14) Dentistry and oral hygiene. Each committee will make its report and recommendations to the Commission, upon whom will devolve the task of preparing the final report for submission to the Legislature. It was manifestly impossible to make this study and prepare the report by the first Wednesday of December, 1935, as called for in the resolve. Therefore, a preliminary report was filed and a request made that the time for completing the report be extended to December, 1936. One or more members of the Commission were assigned to each of the fourteen committees and other individuals with special knowledge and interest in the assigned subjects were invited to serve on the committees. The problems are so diversified that the Commission had a wide field to draw upon and more than one hundred busy individuals have accepted this opportunity for service and are giving much time and thought to the subjects under consideration. Not since Lemuel Shattuck made the report of the Sanitary Commission of Massachusetts in 1850 has a comprehensive study been made in Massachusetts of the problems relating to public health. The report of the Commission should prove of great value to legislators, public health administrators, and to the whole population of the Commonwealth.

The year has passed without any death-dealing epidemics. The only two diseases that have been of unusual prevalence were poliomyelitis and German measles. Although the number of reported cases of poliomyelitis was the third highest on record for the State, the death rate was low and the number of persons left seriously crippled was relatively few, as many more pre-paralytic cases were reported than in previous years.

Milk.—No milk-borne outbreaks occurred for the second successive year but there has been an increase in the number of reported cases of undulant fever. It is well known that Bang's disease (contagious abortion) is widespread among the dairy cattle of the State, and this is even more difficult to eradicate than bovine tuberculosis. The causative agent of this disease will contaminate the milk and produce undulant fever in susceptible individuals who drink it in the raw state. At the present time the only protection against this and other milk-borne diseases is pasteurization of all milk consumed. I am glad to report that the use of pasteurized milk is steadily increasing in the State. There are now twenty-five cities and towns that have passed ordinances permitting the sale only of pasteurized or certified milk. The population living in these communities totals 1,832,460. It is estimated that approximately 80 per cent of the milk now sold in the State is pasteurized.

The Department of Agriculture with justifiable pride celebrated this year the great achievement of having made Massachusetts eligible for inclusion in the modified area group of states. That means that all the cattle within the State are under tuberculin test and that less than ½ per cent are now found tuberculous. For Massachusetts to be included in this preferred list by the Federal Department of Agriculture is indeed a triumph, as before the eradication program began this State had the unenviable record of having the highest incidence of bovine tuberculosis in the country. At great financial cost and by persistent efforts made against determined opposition, the State and Federal Departments of Agriculture have made this eradication program possible. The extermination of bovine tuberculosis will save many children from becoming cripples or dying of tuberculosis. Evidence of this is already at hand, as shown by the rapid decrease in deaths from non-pulmonary forms of the disease. Economically, it will be of great advantage to the cattle raisers, as the value of their stock will increase and the milk production of healthy cows is greater than that from diseased animals. No longer are ordinances necessary to exclude the sale of milk from non-tuberculin tested cows if the milk is produced in Massachusetts.

The Milk Control Board of which the Commissioner of Public Health is a member, submitted to the Governor and Council rules and regulations for grading milk and its sanitary handling. These were approved and became effective on May 8, 1935. These regulations provide for four grades which must conform to the regulations as to butter fat and bacterial content. Handlers of special milk must obtain a certificate that they are not typhoid carriers. Milk according to the grade must be labelled, "Milk, raw or pasteurized," "Grade A, raw or pasteurized," "Special Milk, raw or pasteurized," or "Certified Milk, raw or pasteurized."

Pneumonia Study.—The Commonwealth Fund of New York has continued for the fifth and last year its financial support of the pneumonia study. The effectiveness of serum treatment has been demonstrated as of great value in Type I and to a less degree in Type II cases. The serum may now be obtained by all physicians of the State for the treatment of those types if within the first four days of the disease. Facilities for typing are available at the State Laboratory throughout the twenty-four hours and in all the larger centers hospital laboratory technicians have been trained to do the work for physicians. With the withdrawal of the Commonwealth Fund support, the State will assume the expense of preparation and distribution of this serum. A Handbook for Physicians on the Treatment of Pneumonia, written by Dr. Roderick Heffron, who has been Director of the Pneumonia Study since its inception, has been prepared and will soon be published by the Commonwealth Fund. This will be of great interest and value to physicians.

The Rockefeller Foundation continued its contribution to carry on the investigation into the etiology of cancer and the evaluation of cancer mortality and also provided funds for completing the tabulation of the records of school children examined during the Ten Year Program for tuberculosis case-finding. Records numbering 400,000 are now available for reference and statistical study.

The Commonwealth Fund for the second year allotted funds to the Harvard Medical School through the Children's Hospital to continue in cooperation with the Department of Public Health the experimental work being done on the preparation and evaluation of placental extract in the control of measles. The results of the administration of this extract to prevent or modify measles are very encouraging. The methods of manufacture and standardization are not yet perfected and present problems for further research and experimentation.

New Construction.—The Legislature provided for a cancer and tuberculosis unit to be built on the grounds of the Westfield State Sanatorium. Insistent demands were made by the residents of western Massachusetts for a cancer hospital in that section of the State, as they felt that it was a hardship to send patients who needed special treatment so far away as the Pondville Hospital. Furthermore, there was a long waiting list for that institution that often caused much delay in gaining admission. A cancer hospital of fifty beds would be too small an institution to operate as an independent unit, so it was deemed wise to combine it with a 150-bed section for tuberculous adults. Provision for such cases has never been adequate in the western part of the State. The contracts have been awarded and the new buildings will be ready for occupancy early in 1937. This hospital building is planned so that as the need for tuberculosis beds declines, as we anticipate it will, sections of the wards now planned for tuberculosis may be utilized for cancer cases.

At the Pondville Hospital a new ward of 25 beds, an addition to the Out-Patient Department, and a new service building with operating rooms, kitchen and dining room were opened the middle of December. A new dormitory building was requested to house the personnel made necessary by the additional patients and the operation of the 48-hour law. Unfortunately, funds were not made available and the request for this building is renewed in this year's budget.

Rutland State Sanatorium.—This institution was built in 1898, the first State sanatorium in the United States. It was a pioneer but the treatment carried on there through the thirty-eight years of its existence has kept pace with new discoveries and methods as they have been proven to be effective. It may now be said that as far as treatment is concerned it is modern in every way, but the buildings in which it is carried out are obsolete and constitute a definite fire hazard. They should be replaced with fireproof structures more on the order of a general hospital and better adapted to the present-day methods of treatment. The reconstruction of this institution should be begun and an appropriation is requested in this year's budget to replace four of the old wards.

Social Security Funds.—The passage of the Social Security Act may make available to Massachusetts about $100,000 from the U. S. Public Health Service to be used to promote and supplement public health activities in rural areas, and about $75,000 more may be allotted from the Children's Bureau of the U. S. Department of Labor for maternal and infant care. Further funds will be allotted to the State for the care of crippled children. Detailed plans of each project must be submitted to the Surgeon General or to the Children's Bureau, as the case may be, for their approval. Persons employed on these projects must be well qualified by training and experience and come up to the standards set by the Federal Departments. Two projects have been approved by the Surgeon General. One of these is to form a Berkshire Health District of as many of the thirty towns in that county as will vote to join such a district. The Southern Berkshire Health District of ten towns is willing to become a part of this larger district and looking toward this end has changed the name to the Berkshire Health District. The Commonwealth Fund is willing to continue its cooperation for another five years. The larger district could be financed by an appropriation of 50 cents per capita from each town; 25 cents per capita would be added to this amount by the Commonwealth Fund, and an additional 25 cents per capita from Social Security funds, making $1 per capita available to maintain the services of a trained health officer, public health nurses, sanitary inspectors, dental hygienist, and a milk laboratory. Such a health department would be able to carry on an adequate health program in the rural areas comparable to that now being done in large cities.

It is hoped that a similar plan may be carried out in Franklin County which has no cities and twenty-six towns. The 50,000 population of this county would benefit greatly by forming a health district and taking advantage of the Federal money that would be available to them. Other areas in the State will be eligible where a group of towns will unite to form a district having a population of 20,000 or more. This number will be necessary to provide a budget large enough to maintain a good public health department.

The Nashoba Health District of ten towns, with a population of about 17,000, is carrying on its health activities in a very satisfactory way. It is hoped that several of the surrounding towns will vote to join the district and take advantage of the opportunity to obtain better health service at a very reasonable cost. The Barnstable County Health District is in need of a better milk control service which can be obtained by providing the sanitary inspector with a milk laboratory so that samples of milk could be frequently checked. A supervisor of public health nursing is needed to standardize the nursing service.

Board of Health Records.—Through the generosity of the Commonwealth Fund the service of a field clerk was continued to aid boards of health in improving their system of keeping records. Many towns have availed themselves of this assistance with the result that their records in regard to communicable disease are now in good order and available for reference and statistical study.

II. Communicable Disease

The number of cases of communicable disease reported has been 108,891, as contrasted with 113,559 last year. The two diseases that reached epidemic proportions were German measles and infantile paralysis, in the control of which health departments are helpless. In those diseases for which specific measures may be taken, however, the year has been marked by very striking improvements in the decline of diphtheria, typhoid fever and pulmonary tuberculosis to levels never previously attained. At the same time the deaths from whooping cough and scarlet fever have been at a lower level than ever previously recorded.

Prevalence of Special Diseases

Anterior Poliomyelitis (Infantile Paralysis).—The reported incidence of anterior poliomyelitis reached the third highest figure in the history of the State, 1,392 cases being reported as compared with 1,428 for 1931 and 1,927 for 1916. The figures give, however, a false impression as to the actual prevalence of the disease owing to the fact that in recent years many cases have been reported that would not have been included in the figures in earlier years. In 1916, and previous to that time, practically all of the cases that were reported were paralyzed, the diagnosis being based upon that condition. The cases that did not at any stage develop paralysis were not recognized as a mild form of the same disease. Medical knowledge has progressed so that at the present time Massachusetts physicians are able to diagnose the non-paralytic type of poliomyelitis in a very substantial number of cases. The inclusion of this group in the total gives, however, a false picture as to the current outbreaks when compared with other years. In 1935 in some parts of the State as many as three-fourths of all the cases reported were non-paralytic in type. Therefore, it is not possible to make a direct comparison between the Massachusetts outbreak and that of other states or with previous years in this State as the proportion of the reported cases that have been paralyzed varied greatly, due in all probability to the degree to which the non-paralytic cases were recognized. For this reason the Public Health Council recently voted to change the regulations in regard to the reporting of this disease and, taking effect January 1, 1936, the paralytic and non-paralytic cases of poliomyelitis are to be reported separately. It is the plan of the Department that after that date all the non-paralytic cases would be followed up with the local board of health to obtain a supplemental report if paralysis develops, necessitating a change in the classification. This change in the Massachusetts regulations complies with the request of the U. S. Public Health Service which has asked all states to make the differentiation in their reports between these two types of the disease so that in future years more nearly accurate and comparable data will be available.

The epidemic of 1935 was felt throughout most of the eastern part of the United

States. Throughout New England, and especially in Massachusetts, the cases were confined very largely to the communities bordering or near the coast. In Massachusetts there was one large focus involving the Metropolitan area, beginning in Boston and spreading first into the north Metropolitan and later into south and west Metropolitan sections. The North Shore was affected simultaneously with the Metropolitan area, though the incidence did not reach the same levels. In the southeastern corner of the State, Fall River, with 114 cases reported, had the highest incidence of any single Massachusetts community. A number of cases occurred in adjoining towns. Other parts of the southeastern area and parts of the Blackstone Valley were invaded, apparently in large part as an extension out of Rhode Island. In the Merrimack Valley there was an independent focus involving particularly the cities of Lowell and Haverhill. The incidence of the disease in the western half of Massachusetts was not beyond average figures.

The Department has continued during the year to furnish convalescent serum and to make diagnostic consultation service available for suspected pre-paralytic cases. Consultants of the Department saw 143 cases in consultation with 134 physicians, 87 of these cases being actually poliomyelitis. Clinics for collection of blood for the preparation of convalescent serum were held in conjunction with boards of health in fifteen cities and towns. Through the assistance of these boards of health and the donors of blood, convalescent serum in adequate quantities was at all times available. In making this serum available, however, the Department attempted to stress the fact that it did not feel that the serum had necessarily any therapeutic value, but that it was furnishing the serum merely because there were so many physicians and people who had confidence in this treatment.

Diphtheria.—This disease has continued to decline, reaching the level of only 399 cases as compared with 629 in 1934. The number of deaths has decreased even more strikingly, with only 23, as compared with 50 last year. These figures may well be compared with those for 1923, the year immunization began, when there were 9,018 cases and 579 deaths from this disease. During four of the months of the year there were no deaths whatsoever from diphtheria, this being the first year the State has ever had a single month free of deaths from this disease. These figures for 1935 place Massachusetts as a state having one of the lowest diphtheria rates in the country, in marked contrast to the position which it occupied some ten to fifteen years ago, when the rate was among the highest. Even more encouraging than the actual decline has been the evidence that even lower levels may be attained so that we can confidently look forward in future years to a far smaller toll from diphtheria than that which we now have. This decline has been experienced fairly uniformly throughout the State even though there are some communities in which it continues as a major problem. In such communities the program of immunization that has been carried out has left much to be desired. The decline in the incidence of diphtheria can be attributed in large part to the immunization work carried on by boards of health or school committees. During the past year clinics were held in 258 communities of the State. Whereas a year ago there were 14 communities that had never provided for immunization, there are as the year closes only 5 where the boards of health have been completely negligent in this matter. Fortunately all of these are small communities, though this would not prevent a high attack rate among these children when and if the disease should be introduced, as has occurred in other small towns. In an effort to maintain this work from year to year until such time as immunization is so extensively practiced by the physicians that there will be no further need for clinics, the Department has urged all boards of health to obtain a specific appropriation for the conduct of diphtheria immunization work. Exact figures as to the extent of immunization in private practice are not available, but there is reason to believe that the number, while increasing from year to year, is still too small to bulk large in the total child population. This means that health departments, if they are to make further strides in the control of diphtheria, must place further emphasis upon reaching the preschool children.

The immunization work being carried on in the State has relied upon the use of toxin-antitoxin or toxoid solutions, with growing emphasis on the latter. One or two communities have experimented with the alum precipitated toxoid. It has seemed to the Department, however, that until further data are available as to the permanence of the immunity from a single injection and until the undesirable reactions occasionally encountered with it can be eliminated, it is the part of wisdom to limit its activities to established and proven immunizing agents.

During the year the Department has revised its popular pamphlet regarding diphtheria immunization and has at the same time continued the distribution of cards used by local boards of health to promote immunization during the first year of life.

Encephalitis Lethargica.—This disease has had the lowest recorded incidence in the history of the State, with only 16 cases as compared with a previous minimum of 22 in 1932. These figures, however, are not to be interpreted as an exact measure of the incidence of such infection, as there is in many cases reasonable doubt as to the accuracy of the diagnosis, and furthermore, there is much reason for doubting the adequacy of the reporting. The figures are significant, however, as compared with previous years in indicating the lack of any evidence of increase in such infections, such as has been experienced in some other parts of the country.

Epidemic Cerebrospinal Meningitis.—The past years have seen this disease at its lowest level since it was made reportable; 1933 marked the low point, with some increase in 1934, and an even further increase in 1935. There is probably no cause for alarm in this increase as the history of the disease shows that it occurs in cycles lasting two or three years, with several year intervals between the cycles. There has been no evidence of any particular localization of the disease and therefore no reason at present to be apprehensive as to outbreaks such as affected Detroit in 1929 and 1930. With our lack of ability to control such infections it may, however, be but a matter of time before some Massachusetts community falls the victim of such an outbreak.

The work of Dr. Fothergill at the Children's Hospital, Boston, in the diagnosis and treatment of Pfeiffer bacillus meningitis raises the suspicion that a certain proportion of the cases reported as epidemic cerebrospinal meningitis are due not to the meningococcus but rather to the Pfeiffer bacillus. Such evidence explains apparently some of the instances in which the patient fails to respond to the antimeningococcus serum. The extent to which the Pfeiffer bacillus may be confused with meningococcus infections and its distribution throughout the State are at present unknown. For this reason the Department began toward the end of the year to make an effort to obtain so far as possible spinal fluid from reported cases of epidemic cerebrospinal meningitis so that these fluids might be examined for the possible detection of other unrecognized Pfeiffer bacillus infections.

Gastro-Enteritis.—On numerous occasions during the year the Department has been called upon to investigate cases of gastro-intestinal disturbances, presumably due to food. In some instances these cases were unquestionably due to food infection, but in many others the evidence very strongly pointed against a possible common article of food. As more and more of these cases are being investigated the evidence becomes increasingly strong that a form of gastro-enteritis can occur which is probably spread through the upper respiratory tract. This type has been seen on several occasions within schools and colleges as well as in certain communities. There is great need for more intensive epidemiological studies on these outbreaks as well as bacteriological studies.

Increasing attention is being given to outbreaks of food poisoning in which the vehicle for the spread of the infection was pastry with a custard filling. In many instances it has been shown that an hemolytic staphylococcus capable of producing a heat stable toxin was the etiologic agent. One such outbreak occurred during the month of February in the western part of the State, which was unquestionably due to eclairs sold by bakery trucks that distributed through the towns in the Berkshires and into the eastern end of New York. In many of these eclairs hemolytic staphylococci were isolated. Attempts to identify these organisms through feeding filtered broth cultures to monkeys were unsuccessful in showing the existence of a soluble toxin. Although these organisms were isolated, there was no evidence that this particular strain produced toxins capable of causing illness. The problem of preventing recurrences of such outbreaks is at present very confusing. Although we know that certain strains of such hemolytic streptococci can be the cause of such outbreaks, we do not know what is the source of these organisms or how they are introduced into food.

Influenza.—There has been a remarkable freedom from influenza scares during the current year. The Department has continued its plan of morbidity reporting from schools, industries and visiting nurse associations as a check upon abnormal incidence of respiratory infections during the winter months but has not found any such occurrences during the year.

Malaria.—Seventeen cases were reported during the year, all of which unquestionably contracted their infection outside of Massachusetts.

Measles.—The recorded incidence of this disease during 1935 was lower than in any previous year except 1919, while the deaths were at the second lowest figure on record, that for 1933 only being lower. Unfortunately, there was some increase in the case fatality rate, due probably to the fact that what measles occurred was concentrated very largely in several of the industrial communities where because of economic conditions the case fatality rate is normally higher than in other sections. The death toll from measles was still very strikingly below the figures that were characteristic of this disease ten or more years ago. Thus, during the five-year period 1921–1925, inclusive, the average number of measles deaths per year was 244, whereas during the past five years the average number has been but 57, in spite of the fact that the disease has over the period of time been apparently equally prevalent. How much of this decline can be attributed to an uncontrolled change in the virulence of the virus and how much to community efforts to reduce the mortality largely through public health nursing programs may be debatable, but it seems inescapable that the nursing program has contributed materially, especially when a similar decline is noted in whooping cough in which, as in measles, there has been no appreciable decline in the number of deaths for twenty-five or more years until ten years ago.

The use of the placental extract, which is now being manufactured by the Department in cooperation with Dr. McKhann of the Children's Hospital, has been further developed during the year with very encouraging results. The results available at the present time indicate that it will be possible to utilize this material to reduce the incidence of complications and therefore deaths among children known to have been recently exposed to the disease, and to postpone or modify the disease in those age groups where the risk of measles is greatest.

Pneumonia, Lobar.—The reported incidence of lobar pneumonia for the past year has been slightly in excess of that of a year ago. At the same time there has been a slight increase in the number of deaths, though still materially below any other year except 1932 and 1934. This slight increase does not, however, indicate that there is any interruption in the rather steady downward trend in the toll of death from this disease.

Rabies.—During the first part of the year the incidence of rabies was increasing rapidly and was materially greater than at any time since 1931. These cases were occurring largely in Middlesex County, the Metropolitan District, and the south side of the Metropolitan area. In conjunction with the Division of Livestock Disease Control in the Department of Agriculture, an intensive effort was made by boards of health to conduct clinics to inoculate dogs against rabies. Such clinics were held in sixty-two communities. Although there were many communities in the sections of the State most involved that did not conduct clinics, the response was such that within a period of four months rabies had fallen from the highest to the lowest level since 1931. The Department is gathering as extensive data as possible in regard to the value of rabies control through this method. Although the data are as yet very incomplete, it is evident that the method, while not successful in every instance, confers a sufficiently high protection upon most of the dogs so treated that it does very definitely limit the spread of the disease and may even stop an outbreak in a community. As such, it is unquestionably worthy of more extensive use than at present.

Two human cases of rabies occurred. One of them was a Cambridge boy who refused antirabic treatment after being bitten on the hand by a stray dog. The other was a boy in Woburn who was bitten by a stray dog and developed rabies in spite of antirabic treatment. This is the first case on record in the Department in which there has been a failure of treatment, except in those instances where the bite has been on the face or treatment has been delayed too long.

Scarlet Fever.—With only 8,274 cases reported, scarlet fever reached the lowest level since 1922. During the latter part of the year, however, the monthly figures exceeded those of a year ago, indicating that the disease has once more started upward on one of its periodic swings. The next two or three years will probably see a markedly increasing incidence of this disease. Coincidental with the low incidence of the disease, only 59 deaths occurred, which is the lowest record in the history of the State.

The studies carried on in other parts of the country have shown that it is possible to reduce the conventional four-week isolation period for scarlet fever to a shorter period without increasing the risk of spreading the disease upon release of the patient from isolation. These studies have shown also that there is a definite seasonal relationship as well as a variation with age in the risk of such secondary infections. It has not seemed feasible at present to set up an isolation policy conditioned upon age and season, but it has seemed desirable that in those cases which are not complicated the isolation period should be shortened to three weeks. The Department made such a recommendation to boards of health, many of which have already adopted this plan. This will mean a greatly reduced hospitalization bill without at the same time increasing the risk to the community.

The studies of scarlet fever immunization through the use of toxin treated with formalin that were begun in 1931 have been continued. This immunization is now a routine procedure in the Department's hospitals for children and in the institutions for the feebleminded, experience showing that since this has been instituted scarlet fever has disappeared. This immunization procedure has also been made available in ten institutions receiving children and its use has been extended to include four nurses' training schools.

Community immunization programs have been carried on in Bridgewater, East Bridgewater, Framingham, Gloucester, Greenfield, Holliston, Rockport, Shirley, Wellesley, the Southern Berkshire area, and the parochial school system in the city of Worcester. A total of approximately 15,000 children have been Dick tested, and the immunizing agent administered to approximately 7,000. As the work is continuing under the nature of a study, it is still too early to formulate a definite report on the effectiveness of this so-called toxoid immunization. There can be no question, however, as to the harmlessness of the procedure and the data now available indicate very strongly that it has a real protective value.

Septic Sore Throat.—There were 193 sporadic cases of this disease reported during the year. There was no reason to believe that any of these were spread by infected milk.

Smallpox.—The value of the State's compulsory vaccination law continues to be demonstrated as for almost four years the State has been free from smallpox, the last cases having occurred in connection with the Fitchburg epidemic in January and February, 1932.

Tuberculosis.—The reported incidence of tuberculosis was about equal to that of a year ago, though the deaths showed a distinct decline. The decrease in deaths without a coincidental decline in cases probably represents better case-finding procedures and reporting of cases. There was a slight decline in the number of cases of extra-pulmonary tuberculosis but a very striking decline in the number of deaths which fell from 214 to 155, a decrease of about 25 per cent. The total deaths from all forms of tuberculosis were 1,947 as compared with 2,116 in 1934, and the death rate from this disease will be approximately 43 per 100,000, a drop of 5 points, a most satisfactory showing.

Typhoid Fever.—There has been a continuation of the decline in typhoid fever, only 112 cases being reported, as compared with 135 a year ago. The decline in the sporadic cases was even more striking inasmuch as the current figure indicates one outbreak of twelve cases, whereas in 1934 the largest single outbreak was but four cases. The number of deaths from the disease also showed a decrease. When the deaths fell from 22 in 1933 to but 13 in 1934 there was speculation as to whether or not such a drop could be maintained. The end is certainly not yet in sight for we have every reason to believe that the number of cases and deaths will decline even further so that ultimately typhoid fever will be as rare as is smallpox today in Massachusetts.

Of the 112 cases that occurred, the source of infection was found in 25 instances. Of these, 7, and possibly others, were apparently due to an industrial water supply polluted through a cross-connection, 13 were due to contact with a carrier, 5 were secondary in a family to a previous case, and in the remainder it was not possible to prove the probable source of infection. Investigation of cases brought to light 12 typhoid carriers. In addition, three other carriers were added to the list as a result of the examination of stool specimens during convalescence. Four carriers underwent gall bladder removal in the hopes of curing the carrier condition. The total number of carriers who have undergone gall bladder removal now reaches 29. All of these, with the exception of one, were found to have gallstones. Of these, 15 have been formally removed from the carrier list, three others submitted all of the necessary specimens other than the second bile sample, and the remainder have either lost interest in being removed from the list or have not yet had time to submit the required number of samples. The year ends with 108 names on the active carrier list. The high carrier discovery rate of recent years has been due in large part to the practice of routinely culturing all members of a household where a case of typhoid occurs. This practice has not only brought to light a large number of otherwise unsuspected carriers, but has also resulted in bringing to light certain carriers who should have been found in previous years had such a procedure been routine practice.

Undulant Fever.—Forty-two cases of undulant fever were reported as compared with only 15 last year. This increase of over 100 per cent in the cases may represent either an increased prevalence of the disease or a better recognition of it. On investigation of these patients, all but 5 gave a history of drinking raw milk. There is a high incidence of Bang's disease in the dairy cattle of the State and the problem of preventing undulant fever can be solved either by pasteurization of all milk or insisting that all milk come from abortus free herds. The former is a far simpler method, as the eradication of Bang's disease is very difficult, much more so than the eradication of bovine tuberculosis. Undulant fever at the present time constitutes in Massachusetts our principal milk-borne disease but it is confined to those communities where raw milk is being sold and is limited to those individuals who refuse to face the facts and prefer to use the raw supply.

Whooping Cough.—The reported incidence of whooping cough reached the lowest level since 1924, with only 5,492 cases reported. This is in sharp contrast to the previous year, when the disease reached the highest reported level in the incidence history of the State. At the same time the 66 deaths represented a new minimum. What may be the factors that have been instrumental in the decline of deaths from whooping cough during the past ten years is very problematical, though it seems very likely that because of the coincidental drop in measles and whooping cough beginning about ten years ago, general hygienic measures and health education brought to the public by the public health nursing program have played a major part in this work. Of the acute communicable diseases, whooping cough today presents the most serious problem, exacting a heavier toll than any of the other childhood diseases other than primary pneumonias.

Chicken Pox, German Measles, and Mumps.—This group of diseases, while extremely prevalent and much more so than the official figures would indicate, are important not because of the toll of life exacted by them but more as a general nuisance to the community. The past year saw the most extensive German measles epidemic of which we have record, reaching a toll of 33,265 cases as compared with the previous maximum, 9,426 cases in 1918. With our present knowledge there is nothing that a health department can do to prevent the spread of the disease, and it is of such slight importance that a department would hardly be justified in spending its limited funds to combat such a situation. There can be no doubt that the conventional measures of isolation of the patient and quarantine of the contacts are utterly ineffective and work a needless hardship upon many individuals without at the same time contributing anything to the community.

Chicken pox also equalled the record high figure of a year ago. As the number of cases of this disease has been constantly increasing over a period of years we must conclude that this is due not to an increased prevalence but to a more complete reporting of the cases.

The reported incidence of mumps has been somewhat low, this disease joining German measles and chicken pox as one for which we pretend to do much but in reality accomplish nothing.

Gonorrhea and Syphilis.—There has been a decrease of 345 reports of gonorrhea and an increase of 846 reports of syphilis for the year. The increased reporting of syphilis may be due in some measure to the recently adopted practice of enclosing a blank report form with every positive blood report from the Wassermann Laboratory as well as with every package of arsenicals distributed to physicians. The Department's Bacteriological Laboratory makes only a relatively small proportion of the examinations of smears for the gonococcus, so there is no comparable method for stimulating the reporting of gonorrhea. There have been 3,637 persons reported as having prematurely discontinued treatment or as having been the source of or in contact with infection. This is a slight increase over the previous year.

The fourteen State-aided clinics for the treatment of gonorrhea and syphilis reported 2,717 new cases of syphilis, and 2,968 new admissions for gonorrhea. There has been a slight decline in the reporting of new admissions to clinics and it is apparent that physicians have reported syphilis better than last year, since the total number of reports of syphilis has increased as has the total number of visits to the clinics. Thus year after year there is evidence that patients tend to remain under treatment longer and to visit the clinic more regularly.

For the third successive year the Boston Dispensary has been assisted by the Massachusetts Society for Social Hygiene and this Department in providing treatment at night clinics for patients able to pay only a part of the fee or no fee at all. The average monthly attendance at these clinics of patients unable to pay has declined from 262 to 202 per month. Only 5,747 treatments were given at a reduced fee or no fee, compared to nearly 8,000 such treatments last year.

Although it is practically impossible to determine how much local boards of health are paying clinics for the treatment of patients with gonorrhea or syphilis, it is the general impression that the local boards are assuming this responsibility increasingly each year.

Arsenicals.—Approximately 56,500 grams of arsenicals were distributed during the year at a total cost of a little over $12,000. One hundred and fifty-one new physicians have been added to the list of those to whom arsenicals have been given, and a total of 445 different physicians ordered these drugs, bringing the total number of physicians who have ever ordered arsenicals from this Department to 1,373. Over 70,000 pieces of literature have been distributed and over fifty lectures on gonorrhea and syphilis have been given in medical societies, medical schools and colleges, hospitals, institutes, etc. The Social Hygiene Lecturer divides her time between this Department and the Massachusetts Society for Social Hygiene and spends all of her time in the field. Many thousands of people have attended these lectures.

Division of Biologic Laboratories.—During the year much attention has been devoted to a survey of distribution methods and as a result of this study it was found that certain communities were carrying unreasonably large stocks of products or maintaining too many distribution points, resulting in some wastage. To remedy the defects noted, it has been arranged that each local board of health in the larger communities now orders all supplies for that community through its own office or an agency selected by it, usually a hospital or drug store. This gives the local boards of health reliable information of the volume of orders from their town and has resulted in some decrease in the quantities of products distributed. Near-by hospitals and physicians are still supplied directly by the laboratory if they wish to send for the products.

The distribution of antimeningococcic serum has been treated differently and about sixty hospitals have been selected as distributing stations.

The Pneumonia Study and Service carried on under grant of the Commonwealth Fund comes to an end in December but it is planned to continue the major part of the work as a regular function of the laboratory.

The distribution of diphtheria antitoxin continues to decrease as the incidence of the disease diminishes. The proportionate decrease in distribution was larger than for any year since 1928, the year when the demand for this product began its downward trend. There are now no horses kept for diphtheria antitoxin production as the stock on hand is sufficient for present needs. The amount of toxin-antitoxin distributed from the laboratory is decreasing each year and the amount of toxoid is steadily increasing, which shows that the physicians of the State are gradually changing over to the latter product. Some study has been given to the use of alum precipitated diphtheria toxoid and a small quantity has been made and is under clinical trial. Until more definite evidence is available concerning the immunizing value of this agent and its freedom from unpleasant reactions, no attempt will be made to further its use.

Wassermann Laboratory.—The number of tests performed has increased during the year, showing an increase of nearly 5 per cent, and the number of specimens submitted for serological examination for evidence of syphilis has increased about 12 per cent.

The number of agglutination tests for Brucella abortus for the Division of Livestock Disease Control shows a marked increase reaching a total of over 16,000. Five hundred examinations for rabies were made. This number exceeds any other year since 1931.

Bacteriological Laboratory.—Although the total number of specimens examined by the Bacteriological Laboratory during the past year has been less than in 1934, the reduction has been due entirely to a lessened number of diphtheria cultures, there being a decline of almost 50 per cent in this item. For all of the other types of examination there has been a material increase and as these in general are more time-consuming the load on the laboratory has not been actually lessened. The Pneumonia Study which comes to an end this year placed an additional load upon the laboratory for the five years in which it has been carried on. This was largely financed by outside funds. One of the two bacteriologists employed on this work has been taken over, the other position being abolished. This must mean that pneumonia typing in the future will become very largely routine work without the opportunities that existed previously for extensive cross-checking as to the relative values of typing methods. Past experience, however, has yielded sufficient evidence as to the validity of the rapid Neufeld method so that there is little need for further routine checking along this line.

Considerable work has been done during the past year with reference to cultural methods for the isolation of tubercle bacilli. An unusual number of specimens for food poisoning have been examined, all but one of which yielded negative results.

III. NON-COMMUNICABLE DISEASE

Division of Child Hygiene.—The work of this Division is chiefly educational and enters many fields.

Maternity Service.—Monthly letters have been sent out to more than 27,000 persons giving instruction in prenatal care and care of the baby. This service is increasing each year and apparently is much appreciated. A series of eight two-day Maternity Institutes was held for the nurses of the State under the auspices of the Commonwealth Fund and this Department. These were held in Pittsfield, Greenfield, Springfield, Worcester, Lowell, Boston, Harwichport, and Taunton. The total attendance at all these institutes was 712. This is nearly half of the total number of public health nurses employed in the State. Public health nursing consultants assisted the local communities in the formation of Mothers' Classes and in the continuance of classes already established. This type of instruction in maternal and child care meets a need and is well received in many communities. Well Child Conferences were held by the Division staff in 18 towns. The total number of examinations made was 1,334. A total of 217 towns have had State Demonstration Well Child Conferences conducted by the Department staff. In 51 of these communities local Well Child Conferences are now held with a physician in charge, and 16 have conferences with only a nurse in attendance. In Northampton, Southampton, Westhampton and Williamsburg the three-year demonstration Well Child Conferences were completed. In 15 towns the pediatrician of the Well Child Conference staff gave talks on preschool and infant hygiene. A special series of talks was given at five of the State Teachers Colleges, to the nursery school teachers under the E.R.A., and in four schools in Newton to the Women's Americanization Classes. Prenatal programs were inaugurated in several other towns. The usual cooperation was afforded the local parent-teacher associations and other local organizations and nurses in providing printed material and advice for the conduct of Summer Round-Up activities.

An outstanding activity of the Emergency Relief Administration was the formation of Preschool Centers and Nursery Schools as local projects. The staff of the Division of Child Hygiene was called upon frequently to participate in this activity. Surveys were made of these Centers by the consultant nurses in 76 communities of the State and talks were given for nurses and others carrying on these projects.

School Hygiene.—The most interesting and outstanding project in school hygiene was that in connection with the town of Millville. This Department was asked by the State Commission governing the town to take on the school health service for that community. Of particular value to the Department was the opportunity thus furnished for experiment and research. Studies were made to determine how much can be accomplished in the small town by a school health officer giving an average of approximately 7 hours a week to such service. When this problem is worked out, it will give us a standard by which to measure work done by school health officers serving several towns. A report of six months' activity in Millville is on file. The present indications are that an unusually large number of children have had their defects corrected. Through private funds a nutritionist was obtained for three months during the summer. All the children were given the audiometer test and those found to have defective hearing were later examined by an otologist.

Four school hygiene surveys were made during the year. In one community an intensive study of school lighting was made. Continued interest was shown in health education in the secondary schools. The school hygiene consultant gave assistance to ten towns in the furtherance of this program. Several issues of the pamphlet named "Contact" were distributed to school officials and this publication met with many favorable comments.

Public Health Nursing.—The series of lectures for hospital training schools, usually given by the Division of Child Hygiene, was discontinued late in the year. An exception was made in the case of the Rutland State Sanatorium where the lecture course was given as formerly. Previous to the discontinuance of this service, courses had been given during 1935 to the training schools of nine different hospitals. The general plan now is that the State Board of Registration in Nursing will urge all hospitals having training schools for nurses to include such public health lectures in their curriculum. The nursing consultants have spent considerable time in promoting the tuberculosis program throughout the State and have made efforts to secure continued immunization against diphtheria. In the school health program in the western district the school nurses were urged to stress the necessity of adequate lighting in the schools to prevent eyestrain. They were also urged to concentrate on meeting teachers in group conferences rather than individually, for the discussion of school health matters. Under the Emergency Relief Administration nursing projects were approved for a number of local communities. Advisory assistance was requested of the Department and the Public Health Nursing Consultants contacted the nurses thus employed, giving advice and help in the conduct of the service, record-keeping, etc. Through the generosity of the Commonwealth Fund, Massachusetts was again awarded scholarships for nurses at East Harlem Nursing and Health Center.

Nutrition.—The members of the nutrition staff have given assistance and practical help in nutrition to many communities. A nutritionist for the large community and an itinerant nutritionist for the small community have come to be recognized as good public health expenditures by a few forward-looking communities in the State. Studies made by the Forsyth Dental Infirmary show that families influenced by nutritionists improve their diet and their health. Feeling that a nutrition demonstration would be of value, nutritionists from the Department staff have been assigned to the Southern Berkshire Health District and to Pittsfield. Another of the Division nutritionists worked out a dental-nutrition plan for a community, which may be useful, not only to Provincetown and to Reading, the towns in which it was carried on, but as a plan for other community nutritionists to adopt. For the small schools with untrained lunchroom managers, school lunch plans have been developed applicable not only to individual schools for which this service was given, but as a guide to others. It was gratifying to have the continued assistance of leaders in the State Federation of Women's Clubs during the year in discovering the needs of school lunches for children and ways of bettering them. The

Master of the State Grange appointed Mrs. Rowe of the Community Service to interest leaders in country towns to work on this problem. Mrs. Stritch and her six regional W.P.A. chairmen attended our school lunch meeting and assured us of their cooperation. Plans have been made for free school lunch projects. About 40 per cent of the cities and towns of the State were surveyed by local leaders. It was felt by the State School Lunch Committee that leaders living in the communities could best keep up the standards for the school lunch by actively supporting the local school authorities. Institutes for school lunch management were held in Boston, Springfield and Weymouth. Adequate market orders at minimum cost were prepared and sent to the headquarters director for E.R.A. who forwarded them to the local officers for these projects. It is of interest to note that food prices in the country towns do not vary much from those for the cities. An intensive three-day conference with E.R.A. nutritionists was held in Worcester. Work was done on menus and market orders for nursery schools. Visits were made to the Army Base and foodstuffs inspected and plans made for the distribution of surplus foods to be given to school lunches as a means of decreasing the food cost. A study was made as to how lowered health and welfare budgets have affected the family with tuberculosis in Massachusetts, and a paper based on this study was presented at the meeting of the National Tuberculosis Association. The findings were that borderline or new poor families were the ones who suffered, whereas the cases on welfare received more adequate aid than they did ten years ago. A study was made of scurvy cases seen in representative hospitals throughout the State and as compared with the predepression case incidence of ten years ago there was no increase in the scurvy cases.

Dental Studies.—In Provincetown a dental-nutrition study was definitely set up to include both the clinic service and the nutrition home visit for children showing decided dental caries. In Reading a similar study merits special attention because of the fine cooperation and intense interest of the local dentists. Over one-third of the very detailed examinations were made by family dentists and the child's full record is kept in the dentist's office to be filled in as dental work is completed during the year. Reports of his cases were given to each dentist as well as the nutrition recommendations made to the family. Some of the important points brought out in this study of 104 children were that all of them had decided caries; in almost one-half of the families there were poor economic conditions; only one-half had good eating habits; one-third had less than 1 pint of milk per day; less than one-half had a raw or cooked vegetable beside potato every day; one-fourth never had raw vegetables during the winter and spring; only one-third had fruit daily, and seventeen had no fruit at all.

There was an increase in the number of towns reporting having carried on the Dental Certificate Plan, 290 as against 261 for the previous year. The children receiving dental certificates numbered 138,191. This includes about 30 per cent of the elementary school children in the public schools.

Health Education.—Many thousand pamphlets and much printed material were distributed through the mail. Many exhibits were prepared and shown in different cities of the State in connection with some of the larger meetings. An outstanding exhibit was prepared showing the work of the Department as a whole for the Massachusetts Medical Society, the Eastern States Exposition, and Brockton Fair. Four issues of "The Commonhealth" were printed, the special subjects being "Cancer," "Tuberculosis," "Personal Hygiene," and "A Handbook for Physicians." "Cancer," "Tuberculosis," and the "Handbook for Physicians" were sent to all physicians of the State.

Division of Adult Hygiene.—This Division devoted the greater part of the time to the improvement of cancer clinics, the organization of new clinics and of the Cooperative Cancer Control Committees. The other activities of this Division have continued and there has been a marked increase in the dissemination of educational material. While group diagnosis in the cancer clinics has been advocated since the early part of the program, its accomplishment in all of them has not been fulfilled until now. The group must consist of at least three men, preferably a surgeon, a pathologist, and a radiologist. When any of these are not available, other physicians may be substituted. Uniform records have been furnished and money has been granted to clinics to enable them to obtain clerical service for keeping complete medical records. All clinics are required to meet at least twice a month. At intervals, determined by the clinic committee, postgraduate teaching for the physicians in the community is required. In some places consultants come to the clinics at stated intervals; others have adopted the plan of having all the physicians in the community serve on the clinic staff; while still others confine their activities to having an address on cancer by some surgeon from another city. Teaching clinics were held at the Palmer Memorial Hospital and the Massachusetts General Hospital for the staffs of the State-aided cancer clinics. Each clinic is furnished the following services by the State: advice, information, and literature; funds for services and travel of social worker, for X-ray diagnosis for those unable to pay, for teaching clinics, for clerical assistance, and for office materials; special clinics for members of the staff; and the opportunity to refer cancer cases to the Pondville Hospital. The group of physicians in charge of the clinic furnish the diagnosis and outline the plan of treatment for any person suspected of having cancer, regardless of his financial status. Every effort is made to have the family physician either come with his patient to the clinic, or send the patient with such information as he cares to furnish. Any individual is admitted to the clinic, although it is preferred to have the patients referred by physicians so that any tendency to use the cancer clinic in order to establish a diagnosis of a condition originally not suspected of being cancer may be eliminated. New clinics have been approved at the following places: Northampton, Beth Israel Hospital, Gloucester, Newburyport, and Greenfield. The Newton Cancer Clinic has been discontinued.

In order to carry out instructions to disseminate knowledge to every individual in the State a Cooperative Cancer Control Committee has been established or is in the process of being formed in every one of the more than 350 communities. This committee is composed of a small central group or steering committee, and a larger group contacted directly by the central committee, and, finally, every individual in the community. Arrangements are made by this committee with the local physicians to speak to small groups in the community. Thus the local physician is given the opportunity to be the teacher in this program and he has been very willing to cooperate in this educational campaign.

Over 40,000 pieces of literature have been distributed. This has included pamphlets on cancer, diabetes, rheumatism, heart disease, and other chronic diseases. The Cancer Clinic Bulletin is issued monthly and mailed to about one-quarter of the physicians in the State. This contains abstracts of articles on cancer and items of interest regarding the clinic program. The three radio broadcasts, Health Forum, Health Review, and Health Messages, have been continued throughout the year. Two articles from the Health Forum are printed weekly in the Boston Globe and one is sent to seventy-four other newspapers throughout the State. The tumor diagnosis service furnished free to physicians has been continued; 2,300 specimens were sent into the laboratory for examination during the year. The following studies are being carried on by the Division of Adult Hygiene: one on the relationship between cancer and tuberculosis; another, financed by the Rockefeller Foundation, includes an investigation into the etiology of cancer and the evaluation of cancer mortality records; an analysis of the changes in the Massachusetts vital statistics between 1850 and 1930; a study of the cancer patients from admission to death; and an intensive study of diabetes.

Pondville Hospital.—At Pondville a new ward including 25 beds, an addition to the Out-Patient Department, and a new Service Building were about ready to be opened at the end of the year. With the opening of this addition there will be a total of 140 beds available for the treatment of cancer. As the average length of stay of each patient is about a month, this rapid turnover makes it possible to hospitalize about ten patients per year for each bed in the hospital. There was a 3 per cent decrease in admissions in 1935 due chiefly to the outbreak of streptococcus infection during the spring which made it necessary to stop all operative work for a period of one month. In spite of this decrease in admissions the amount of operative work was practically unchanged and the out-patient examinations showed a slight increase over the preceding year.

IV. Environmental Control

Division of Sanitary Engineering.—This Division has received 695 applications requiring the advice of the Department. These related to municipal and other public water supplies, to water supplies of dairies, supplies examined at the request of boards of health, water supplies of schools, recreation camps, sources of ice supply, to bathing and swimming pools, shellfish, pollution of streams, sewerage and sewage disposal, and miscellaneous matters including those relating to Civilian Conservation Corps Camps. This number is about 3½ per cent in excess of the number received during the previous year and is the largest number ever received by the Department. Such applications require field examinations by the engineers, and in most cases chemical analyses and bacterial and microscopical examinations by the Water and Sewage Laboratories and the Lawrence Experiment Station chemists.

The rainfall for the year as recorded by the seven long-term well-distributed rainfall stations throughout the State which are under the supervision of this Division was 40.10 inches, which is 4.35 inches less than normal. As a result of the quite favorable distribution of rainfall and curtailed manufacturing during the year, few complaints have been received because of the pollution of streams, but nevertheless complaints have been received relative to sewage overflowing from the North Metropolitan sewerage system into the Aberjona River, the pollution of the Neponset River, a brook in Hinsdale, the Housatonic River in Sheffield, a brook in Hawley, and the upper portion of the Aberjona River in Woburn. The North River in Salem continues to be the most highly polluted stream in the State, and in spite of a report and recommendations by this Department and the Department of Public Works as submitted to the Legislature of 1935 no improvement in the condition of this river has been brought about though a contract for the construction of a tank for the removal of grease from the Salem and Peabody sewage was awarded late in the year.

There have been a number of important changes in certain of the sewage treatment works plants in the State which when completed should reduce the amount of polluted matter entering the streams in the municipalities in question. In the city of North Adams the new sewage treatment works are now in use for the primary treatment of the sewage of that municipality before it is discharged into the Hoosick River, together with works for digesting the sludge. The town of Natick has constructed new works and contracts have been let for constructing additional sewage treatment works in the town of Milford. Construction of the new sewage treatment works in the city of Leominster has advanced considerably during the year. The Department has approved plans for new sewage treatment works at Framingham and at Pittsfield. New sewage treatment works have been completed at Spencer. Plans were also approved during the year for an intercepting sewer and sewage disposal works for Fall River and Mansfield.

The Department has assisted in an advisory capacity in connection with major stream pollution studies being conducted in this State as Federal E.R.A. projects and later as Federal W.P.A. projects. These studies have been in connection with the Blackstone River, the Nashua River, the Connecticut River and the Housatonic River. In carrying out these studies, chemists on the Federal payroll have been employed in the laboratories of the Department, and representatives of the Department have made field examinations and attended many conferences to assist in these studies.

The Engineering Division has given the usual supervision in connection with P.W.A., E.R.A., and W.P.A. Federal projects, and in addition has been called upon to render much engineering service in connection with water supply and sewage at the various State institutions. In addition to the supervision of water supply and sewerage work at the institutions under the supervision of this Department, engineering studies have been made in connection with water supply and sewage disposal at the institutions under the supervision of the Adjutant General and the Departments of Correction, Education, Mental Diseases, Public Safety and Public Welfare. During the year in accordance with the directions of the Legislature this Division has assisted in a number of special legislative investigations as mentioned previously in this report. This Division has continued its program of assisting the authorities in charge of the Civilian Conservation Corps

Camps by making bacterial examinations of the various sources of water supply in use at these camps and, where requested, in matters of sewage and refuse disposal. Also, the usual examinations have been made in connection with the water supplies and sewage disposal work at many recreational camps.

The usual activities relating to shellfish and drainage matters have been carried out, and in connection with the former the Department was obliged, during the early part of the year, to exercise particularly careful supervision over the shellfish entering the State from the north, as for a period of several months certificates for shipments of shellfish into interstate commerce from the State of Maine were not approved by the Federal authorities. The usual supervision has been given to the operation of the two shellfish chlorinating plants. For the first time, this year quahaugs from polluted areas have been treated. Drainage projects have for the most part been under the State Reclamation Board, the chairman of which is a member of the staff of the Division of Sanitary Engineering. The Department has examined water supplies and works for sewage disposal of a number of rural schoolhouses, and at the time of writing this report is assisting in carrying out a Federal project for improving conditions at certain schoolhouses. This project, which is known as the "Community Sanitation Project of Massachusetts," is being financed with funds made available through the Federal Works Progress Administration.

During the past year there have been a number of activities directed by the Federal Government as work relief projects with a view to eliminating or lessening stream pollution, more especially the interstate streams, and to assist in this work various forms of Federal legislation have been proposed, some of which are in the form of compacts. The State of Connecticut has passed legislation permitting that state to enter into compacts with other New England States with the view to reducing stream pollution. Such authority should be provided by the Massachusetts Legislature, and a resolve has been filed with the Legislature to permit the State of Massachusetts to enter into compacts with the other New England States, to permit this Department to adopt rules and regulations to protect sources of water supply rising in this State but used in adjoining states.

Water and Sewage Laboratories.—During the period from January 1 to November 30, inclusive, 8,574 chemical analyses and 3,290 microscopical analyses were made by the Water and Sewage Laboratories. In addition, this laboratory has made special examinations of fats from the North River in Salem, sludge from the Hudson Worsted Company, and certain yeast wastes, and has assisted in the organization of the special river investigation laboratories in Fitchburg and Worcester.

At the Lawrence Experiment Station 9,536 bacterial examinations and 2,440 chemical analyses were made in connection with samples submitted from the various public water supplies, rivers, etc., and the research work carried out at this station. There were also made 563 examinations of shellfish and 167 sand analyses. The personnel of the Lawrence Experiment Station has maintained supervision over the laboratory technique at the shellfish purification plants. The time of this Experiment Station also has been given over to assisting in coordinating the work of the laboratories of this Department and the laboratories of the Metropolitan Water District so far as the work of these laboratories relates to bacterial examinations. A large amount of research has been carried on at the Water and Sewage Laboratories and the Lawrence Experiment Station which will be given in detail in the report of the Director of the Division.

Division of Food and Drugs.—Four new inspectors have been added to the force of this Division during the year. The services of these men were made necessary by the enactment of the law relative to the licensing by the State of wholesale dealers of wood alcohol and because of the increased work on frozen desserts, including the licensing of out-of-State plants, and because of the change in the law relative to the licensing of manufacturers of nonintoxicating carbonated beverages, including those located outside the State, and because of the enactment of new legislation pertaining to mattresses, which includes the sterilization of second-hand material and of feathers and down. There has been an increase of 16 per cent in the number of samples collected and examined, notwithstanding that there was a marked increase in the number of liquor samples submitted by police officers. An increase of nearly 24 per cent was made in the number of samples collected by the inspectors and examined by the chemists and bacteriologists. The total number of samples examined during 1935 was 16,359. The number of prosecutions was less than half of those during 1934. There has been a considerable increase in sanitary inspections due to the frozen dessert law as well as to the law relating to pasteurization of milk. There are 648 licensed frozen dessert plants in Massachusetts and 286 of these plants have been given a sanitary inspection. There were 26 out-of-State plants selling material in Massachusetts, of which 22 have been actually inspected by agents of this Department. The sanitary conditions in the great majority of ice cream manufacturing plants are satisfactory and with the inspection service now provided the others will be brought up to standard. There were 839 individual inspections made of pasteurization establishments. The new regulations in regard to milk grades became effective on May 8, 1935, and every pasteurization establishment was sent a copy.

In connection with slaughtering inspection, 342 slaughterhouses were investigated.

All of the dairies furnishing certified milk were visited and found to be in conformance with requirements.

V. Personnel

The Department was fortunate in having the Governor reappoint as members of the Public Health Council Dr. Richard P. Strong and Mr. James L. Tighe whose appointments expired during 1935.

Due to expansion in certain of the Department's activities, there have been several appointments to new positions. On November 4, Miss Gertrude M. Scott was added to the staff of the Division of Adult Hygiene as a social worker. Two new positions as Food Inspector were created in the Division of Food and Drugs to carry out the duties added by recent legislation. Mr. Daniel J. Chisholm and Mr. Robert B. Lane were appointed on September 21. On October 4, Mr. Ralph Cooper was added to the staff as Inspector of Bedding and Mattresses. As a part of the program for a pneumonia service, originally financed by a private fund, Dr. LaVerne A. Barnes was added on November 1 to the staff of the Antitoxin and Vaccine Laboratory as Senior Bacteriologist to continue the work which he has inaugurated during the past five years. On November 1, Miss Nora McQuade was added to the staff of the Division of Child Hygiene to continue the work she had been doing for the past five years as Public Health Nursing Supervisor, the position having been financed previously by a private fund.

Because of the changes made during the past year in the conduct of the Chadwick Clinics it was found desirable to eliminate one position of Child Welfare Physician, substituting that of Tuberculosis Field Nurse. Because of this change the services of Dr. Harry C. Low terminated on October 31. Miss Mildred Givan, who had served previously with the Clinics on a temporary basis, was appointed to fill the nursing position.

On April 26 the Department witnessed with great regret the compulsory retirement of Miss Elizabeth Penney, Principal Clerk in the Division of Sanitary Engineering. Miss Penney had been employed by the Department since July 8, 1899, and was respected and beloved by the entire staff.

On August 8 Dr. George M. Sullivan resigned as District Health Officer of the South Metropolitan District. Dr. Henry M. DeWolfe, Epidemiologist in the Subdivision of Venereal Diseases, was transferred to fill this vacancy on August 9. On September 23 Miss Gladys L. Crain was appointed as Epidemiologist in Dr. DeWolfe's former position.

Dr. John J. Poutas, Epidemiologist, was promoted on December 17, 1934, to the position of Assistant Director of the Division of Communicable Diseases, and on the same date Dr. B. Barrett Gilman commenced work as Epidemiologist.

Dr. Samuel B. Kirkwood terminated his services as Epidemiologist in the Division of Tuberculosis on May 31, and on June 6 Dr. Edward G. Huber assumed the duties of this position.

On June 18 Mr. Edmund B. Sweeney was appointed Food Inspector to fill the position vacated by Oscar Peterson on June 15.

The illness of Miss Ada Boone Coffey making it impossible for her to return to the Department, her resignation was accepted as of December 31, 1934. On February 15 Miss Helen Chesley Peck was appointed to fill Miss Coffey's vacancy.

On October 9 Mrs. Eleanor Gallinger McCarthy resigned as Public Health Dental Hygiene Supervisor in the Division of Child Hygiene. This position has not been filled.

Mr. Joseph H. Blinn was appointed on September 11 to fill the vacancy in the position of X-ray Clinic Field Agent vacated through the illness and death of Mr. George F. McNamee.

VI. ORGANIZATION

The organization of the Department is as follows:

Commissioner of Public Health	1
Public Health Council	6
Division of Administration: Secretary (1), Epidemiological Consultant (1), Clerks and Stenographers (11)	13
Division of Adult Hygiene: Herbert L. Lombard, M.D., Director Epidemiologists (3), Social Workers (3), Public Health Education Workers (2), Clerks and Stenographers (15)	24
Division of Biologic Laboratories: Elliott S. Robinson, M.D., Director. Assistant Director (1), Chemists and Bacteriologists (11), Laboratory Assistants (3), Laboratory Helpers (8), Stable Foreman (1), Laborers (15), Janitors (2), Clerks and Stenographers (6) (Wassermann Laboratory): Chief of Laboratory (1), Bacteriologist (1), Laboratory Technician (1), Laboratory Assistant (1), Laboratory Helpers (6), Clerks and Stenographers (3)	61
Division of Communicable Diseases: Gaylord W. Anderson, M.D., Director and Deputy Commissioner. Assistant Director (1), District Health Officers (7), Epidemiologists (3), Clerks and Stenographers (8) (Diagnostic Laboratory): Bacteriologists (5), Laboratory Assistant (1), Laboratory Helper (1), Laborer (1), Clerks (2) (Venereal Diseases): Assistant Director (1), Epidemiologist (1), Public Health Education Worker (1), Clerks and Stenographers (3)	36
Division of Food and Drugs: Hermann C. Lythgoe, Director. Chief of Laboratory (1), Chemists and Bacteriologist (5), Inspectors (14), Laboratory Helpers (2), Laborer (1), Clerks and Stenographers (7)	31
Division of Child Hygiene: M. Luise Diez, M.D., Director. Child Welfare Physician (1), Epidemiologist (1), Public Health Dental Hygiene Supervisor (1), Public Health Nutrition Workers (4), Public Health Education Workers (2), Clerks and Stenographers (9) (Maternal and Child Hygiene): Child Welfare Physician (1), Public Health Nursing Supervisors (6), Clerks and Stenographers (6)	32
Division of Sanitary Engineering: Arthur D. Weston, Chief Sanitary Engineer. Engineers and Engineering Assistants (15), Clerks and Stenographers (12). (Water and Sewage Laboratories): Laboratory Coordinator (1), Chiefs of Laboratory (2), Chemists and Bacteriologist (10), Laboratory Assistant (1), Mechanical Handyman (1), Laborer (1), Watchman (1), Clerks and Stenographers (3)	48

Division of Tuberculosis:	
Alton S. Pope, M.D., Director.	
Assistant Director (1), Epidemiologist (1), Superintendent of Sanatoria Construction (1), Inspector of Settlements and Support Claims (1), Social Workers (2), Field Nurse (1), Clerks and Stenographers (9).	
(Tuberculosis Clinics):	
Supervisor of Tuberculosis Clinics (1), Child Welfare Physicians (3), Field Nurses (3), Public Health Nutrition Workers (2), X-ray Clinic Field Agents (2), Clerks and Stenographers (6)	34
Total	286

VII. PUBLICATIONS

The following articles by members of the staff have been published:

Division of Administration

Incidence of Tuberculosis in School Children
Henry D. Chadwick, M.D.
Journal of the American Veterinary Medical Association, 86: 375–381, March, 1935.

Prolongation of Life—
Henry D. Chadwick, M.D.
New England Journal of Medicine, 212: 566–570, March 28, 1935.

Division of Biologic Laboratories

The Control of Diphtheria—
Elliott S. Robinson.
New England Journal of Medicine, 213: 208–210, August 1, 1935.

Serological Relationship between Pneumococcus Type I and an Encapsulated Strain of Escherichia Coli—
L. A. Barnes and Eleanor C. Wight.
Journal of Experimental Medicine, 62: 281–287, August 1, 1935.

Protective Action of Concentrated Antityphus Serum (Murine Type) against European Typhus Virus—
H. Zinsser, M. R. Castaneda and F. D. Hager.
Proceedings of the Society for Experimental Biology and Medicine, 33: 44, 1935.

Immunological Application of Placental Extracts—
Elliott S. Robinson and Charles F. McKhann.
American Journal of Public Health, 25: 1353, December, 1935.

Division of Communicable Diseases

Rabies Control from the Standpoint of the Health Officer—
Gaylord W. Anderson, M.D.
Journal of the American Veterinary Medical Association, 86, January, 1935.

Gonorrhea and Syphilis in the Public Schools—
Nels A. Nelson, M.D.
Bulletin of Massachusetts Society for Social Hygiene, 5, March, 1935.

The Present Status of Scarlet Fever Prevention—
Gaylord W. Anderson, M.D.
New England Journal of Medicine, 213, August 1, 1935.

Scarlet Fever Immunization of Nurses—
Gaylord W. Anderson, M.D., and Warren I. Reinhardt.
Journal of Infectious Diseases, 57, September-October, 1935.

The Prevention and Control of Gonorrhea and Syphilis—
Nels A. Nelson, M.D.
Public Health Nursing, 27, September, 1935.

Trouble Ahead—
Nels A. Nelson, M.D.
New England Journal of Medicine, 213, November 7, 1935.

Present Status of Pneumonia Problem—
Gaylord W. Anderson, M.D., and Roderick Heffron, M.D.
Public Health Nursing, 27, December, 1935.

Social Hygiene in Public Health—
Nels A. Nelson, M.D.
Bulletin of Massachusetts Society for Social Hygiene, 5, December, 1935.

Division of Sanitary Engineering

Sanitary Scoring of Surface Water Supplies—
Arthur D. Weston.
New England Water Works Association Journal, 49, 1, 1935.
The National Recovery Act and Public Works Administration in Massachusetts—
Arthur D. Weston.
New England Water Works Association Journal, 49, 1, 1935.
Chlorination of 48-Inch Pipe Line, New Bedford, Mass.
Ernest J. Sullivan.
New England Water Works Journal, 49, 2, 1935.
A Review of Activated Sludge Theory—
Gail P. Edwards.
Sewage Works Journal, January, 1935.
Disposal of Sewage from the South Essex Sewerage District—
Edward Wright.
Sewage Works Journal, July, 1935.
Presence of Grease Balls in Effluent Presents Difficult Problem—
Edward Wright.
Civil Engineering, July, 1935.
Use of Sources of Water Supply for Recreational Purposes—
Arthur D. Weston.
Water Works Engineering, September 18, 1935.

Division of Tuberculosis

A Survey of Artificial Pneumothorax in Representative American Sanatoria, 1915–1930—
Andrew Peters, Alton S. Pope, William H. Morriss, Edward M. Packard and Oscar A. Miller.
American Review of Tuberculosis, 31: 85–103, January, 1935.
The Question of When Artificial Pneumothorax Should Be Discontinued—
Paul Dufault, M.D., and Armand Laroche, M.D.
American Review of Tuberculosis, 31, 2, February, 1935.
What We Have Learned from One Hundred Intrapleural Pneumolyses—
Frank H. Washburn, M.D.
New England Journal of Medicine, 212, February, 1935.
Calcified Hydrocele of the Tunica Vaginalis Testis—
Charles J. E. Kickham, M.D.
New England Journal of Medicine, 212: 419, March 7, 1935.
Adenocarcinoma of Kidney Recurrent After Twenty Years—
Roger C. Graves, M.D., and Roy E. Mabrey, M.D.
New England Journal of Medicine, 212: 416–417, March 7, 1935.
Chronic Cystic Mastitis—Management in a Cancer Clinic—
Horatio Rogers, M.D., and Ira T. Nathanson, M.D.
New England Journal of Medicine, 212: 551–556, March 28, 1935.
Results of Artificial Pneumothorax in American Sanatoria—
Andrew Peters, Alton S. Pope, William H. Morriss, Edward M. Packard and Oscar A. Miller.
Tubercle (London), 407–415, June, 1935.
The Reexpanded Lung—
Paul Dufault, M.D.
American Journal of Roentgenology and Radium Therapy, 33, 6, June, 1935.
Epidemiological Aspects of Silicosis and Tuberculosis—
Alton S. Pope and David Zacks.
American Review of Tuberculosis, 32: 229–242, September, 1935.
Application of Our Knowledge of Tuberculosis through Case Finding—
Alton S. Pope.
Transactions of the National Tuberculosis Association, 317–328, 1935.

The Use of Dilaudid in Treating Patients with Cancer—
Ernest M. Daland, M.D., and Ira T. Nathanson, M.D.
New England Journal of Medicine, 213: 741–746, October 17, 1935.
Carcinoma of the Stomach in Identical Twins—
Raymond E. Militzer, M.D.
American Journal of Cancer, 25, 3, November, 1935.

Division of Child Hygiene

Health and the Girl Scout—
Albertine P. McKellar.
The Trail Maker, June, 1935.
A Progressive Community Provides for its Children—
Mary Spalding and Annette Herr.
Pamphlet of the Massachusetts State Federation of Women's Clubs.
The School Lunch Survey in Massachusetts—
Helen Inman Duff.
Journal of Home Economics, November, 1935.

Division of Food and Drugs

Official Control of Pasteurization in Massachusetts—
Hermann C. Lythgoe.
Annual Proceedings of the International Association of Dairy and Milk Inspectors.

DEPARTMENT OF PUBLIC HEALTH

Appropriations and Expenditures for the Year Ended November 30, 1935

	Appropriations Plus Amounts Brought Forward	Expenditures to November 30
Division of Administration	$36,425.22	$35,636.20
Division of Adult Hygiene	85,840.51	83,027.19
Division of Child Hygiene	53,480.75	51,676.96
Maternal and Child Hygiene	35,232.63	32,227.89
Division of Communicable Diseases	90,746.65	89,368.60
Venereal Diseases	41,680.00	38,529.99
Division of Food and Drugs	68,580.00	66,836.84
Administration of Shellfish Law	2,850.00	2,850.00
Division of Biologic Laboratories:		
Antitoxin and Vaccine	108,632.06	103,744.93
Wassermann Laboratory	22,191.00	21,768.89
Division of Water Supply and Sewage Disposal	148,621.69	147,074.17
Sundry Investigations—Budget Item 590 A	3,000.00	2,918.91
Division of Tuberculosis	42,775.08	42,177.15
Subsidies to Cities and Towns	465,000.00	464,987.91
Tuberculosis Clinic Units	53,400.00	50,376.94
	$1,258,455.59	$1,233,202.57

Receipts for Year ended November 30, 1935

Licenses, etc.	$6,095.69

State Sanatoria and Pondville Hospital

Appropriations and Expenditures for the Year ended November 30, 1935

	Appropriations and Balances	Expenditures
Lakeville State Sanatorium	$308,802.53	$298,374.77
North Reading State Sanatorium	255,819.32	242,178.67
Rutland State Sanatorium	343,073.46	327,444.68
Westfield State Sanatorium	272,633.73	255,006.71
Pondville Hospital	282,294.27	271,205.64

Special Appropriations

Lakeville:		
Chapter 162, 1934, Item 533 "Lamp Treatment Rm. and Equipment, Men's Ward"	$61.02	$53.35
Chapter 162, 1934, Item 534 "Lamp Treatment Rm. and Equipment, Women's Ward"	34.82	33.52
Chapter 162, 1934, Item 535 "X-Ray Machine and Fluoroscope"	3,941.65	3,898.65
Chapter 249, 1935, Item 597 "Fire Protection"	1,600.00	1,331.11
P.W.A. Docket 1354 Mass. State Project H-1, 1934	1,372.52	524.85
North Reading:		
Chapter 249, 1935, Item 599 "Improving Water Supply"	1,500.00	None
Chapter 249, 1935, Item 600 "Fire Protection"	2,000.00	1,107.84
Chapter 497, 1935, Item 600a "Purchase of Land"	35.00	None
Rutland:		
Chapter 162, 1934, Item 539 "Sprinklers"	3,594.45	3,420.82
Chapter 162, 1934, Item 538 "Sewer Connections"	60,790.00	60,000.00
P.W.A. 1354, Mass. State Project H-2 "Sewerage"	1,028.88	946.10
P.W.A. Docket 2275, Mass. State Project H-3 "New Boilers"	15,859.45	12,795.04
Chapter 249, 1935, Item 602 "Reconstruction of Road"	12,000.00	661.55
Chapter 249, 1935, Item 602a "Improving Water Supply"	3,900.00	3,898.70
Westfield:		
P.W.A. Docket 1354, Mass. State Project H-4 "Sewerage and Filter Beds"	1,232.43	1,035.95
Chapter 249, 1935, Item 605 "Improving Water Supply"	1,500.00	1,472.87
Chapter 249, 1935, Item 606 "Fire Protection"	1,400.00	865.76
P.W.A. Docket 1155, Mass. State Project H-102 "Cancer and Tuberculosis Group"	900,000.00	387.70
Pondville:		
P.W.A. Docket 4200, Mass. State Project H-6 "Hospital Addition"	74,585.05	$55,942.62
P.W.A. Docket 4476, Mass. State Project H-5 "Medical and Service Building"	177,251.37	129,479.85
Chapter 249, 1935, Item 608 "Installation of Incinerator"	2,000.00	1,567.03
Chapter 249, 1935, Item 609 "Moving Bacteriological Laboratory"	2,000.00	None
Chapter 249, 1935, Item 610 "Engine and Generator"	2,500.00	70.50
Chapter 249, 1935, Item 611 "Renovating Old Service Building"	10,000.00	None
Chapter 249, 1935, Item 612 "Water Supply and Sprinklers"	3,000.00	1,394.22
Chapter 249, 1935, Item 612a "Electrical Distribution"	18,500.00	565.93

Receipts

Lakeville State Sanatorium	$134,645.57
North Reading State Sanatorium	73,391.79
Rutland State Sanatorium	153,662.64
Westfield State Sanatorium	61,345.34
Pondville Hospital	92,545.33

Respectfully submitted,

HENRY D. CHADWICK,
Commissioner of Public Health.

REPORT OF DIVISION OF ADULT HYGIENE

HERBERT L. LOMBARD, M.D., *Director*

Deaths from cancer in Massachusetts in 1935 showed a decrease in number over the preceding year for the first time in the twentieth century. While this may not be entirely attributable to the Massachusetts Cancer Program, it is extremely encouraging.

TABLE I.—MASSACHUSETTS CANCER DEATHS, 1910–1935

YEAR	Number of Cancer Deaths	Crude Rate Per 100,000 Population
1910	3,028	89.9
1911	3,199	93.7
1912	3,282	94.8
1913	3,526	100.4
1914	3,586	100.7
1915	3,708	102.7
1916	3,990	109.1
1917	4,057	109.5
1918	4,098	109.1
1919	4,112	108.1
1920	4,494	116.7
1921	4,645	119.3
1922	4,650	118.3
1923	4,775	120.2
1924	5,074	126.5
1925	5,196	128.3
1926	5,341	130.6
1927	5,454	132.0
1928	5,611	134.6
1929	5,672	134.7
1930	5,813	136.8
1931	5,859	137.3
1932	6,153	143.4
1933	6,382	148.1
1934	6,675	154.1
1935	6,482	149.0

The duration of life of cancer patients attending the State-aided clinics is shown in percentage form in the accompanying table. About one quarter of the cancer patients who visited the clinics in 1927 are still living.

TABLE II.—*Percentage of Cancer Patients Attending the Clinics Alive at Yearly Intervals Following Clinic Admission*

Number of cancer patients	5,422
Percentage lost and unknown	5.6
Alive 1 year after	66.5
Alive 2 years after	53.0
Alive 3 years after	45.8
Alive 4 years after	40.8
Alive 5 years after	36.4
Alive 6 years after	32.8
Alive 7 years after	30.1
Alive 8 years after	24.3

During the present year the Division of Adult Hygiene has devoted the greater part of the time to the improvement of the cancer clinics, the organization of new clinics, and the organization of the Cooperative Cancer Control Committees. The other activities of the Division have continued with an increase in the dissemination of educational material.

IMPROVEMENT OF STATE-AIDED CANCER CLINICS

While group diagnosis in the cancer clinics has been advocated since the early part of the program, its accomplishment in all clinics has not been fulfilled until now. The group must consist of at least three men, preferably surgeon, pathologist, and radiologist. When any of these are not available, other physicians may be substituted. Uniform records have been furnished the clinics. These include data previously obtained on social economic problems with the addition of a complete medical record. Money has been granted the various clinics to enable them to obtain clerical service for this purpose. All clinics are required to meet at least twice a month.

At intervals determined by the clinic committee, but in no instance less than once a year, some form of teaching for the physician in the community is required. Some clinics perform this service by having consultants come to the clinics at stated intervals; others have adopted the plan of having all the physicians in the community serve on the clinic staff; while still others confine their activities to having an address on cancer by some surgeon from another city. Several of the clinics have already inaugurated teaching clinics.

TABLE III.—*Teaching Clinics*

CLINIC	Date	Consultants	Number of Doctors Present	Number of Patients Present
Fitchburg . . .	May 15	Dr. J. V. Meigs	8	15
Fitchburg . . .	Sept. 24	Dr. G. W. Taylor and Dr. C. C. Lund	16	18
Gardner . . .	Oct. 4	Dr. E. M. Daland	20	9
Gardner . . .	Dec. 27	Dr. G. W. Taylor	14	5
Lawrence . . .	Feb. 19	Dr. C. C. Simmons	21	19
Lawrence . . .	June 18	Dr. C. C. Lund	33	34
Lawrence . . .	Aug. 6	Dr. C. C. Simmons	10	12
Lawrence . . .	Nov. 19	Dr. C. C. Simmons	29	13
Lynn	Jan. 11	Dr. G. A. Leland	60	27
Lynn	Apr. 26	Dr. G. A. Leland	18	22
Lynn	Nov. 15	Staff	15	20
Newburyport . .	Dec. 11	Dr. G. W. Taylor	18	*
North Adams . .	Sept. 24	Dr. R. B. Cattell	35	*
Pittsfield . . .	Aug. 13	Dr. Dean Lewis of Johns Hopkins	46	15
Worcester . . .	July 10	Dr. E. M. Daland	15	*
Worcester . . .	Dec. 4	Dr. E. M. Daland	25	*
Staffs of State-Aided Cancer Clinics .	May 22	Staffs of Palmer Memorial and Mass. General Hospitals	39	*

* Dry clinic or partially dry clinic.

The clinic itself is furnished the following services by the State: first, advice, information, and literature; second, funds for, or services of a social worker; third, funds for travel of social worker; fourth, funds for x-ray diagnosis for those unable to pay; fifth, funds for teaching clinics; sixth, funds for clerical assistance in clinics; seventh, funds for postage, telephone, stationery, etc.; eighth, special clinics for the staffs of the clinics; and ninth, reference of cancer cases to Pondville through social service.

The purpose of the clinics is to furnish physicians and the public, group consultation service in cancer, as well as to improve the knowledge of cancer among the medical profession and the laity. The group furnishes a diagnosis and outlines a plan of treatment for any person suspected of having cancer, regardless of his financial status. Every effort is made to have the family physician either come with his patient to the clinic, or send the patient with such information as he cares to furnish. Any individual is admitted to the clinic, although it is preferred to have the patients referred by physicians, so that any tendency to use the cancer clinic in order to establish a diagnosis of a condition originally not suspected of being cancer may be eliminated.

STATE-AIDED CANCER CLINICS

There are at present eighteen State-aided cancer clinics. Five of these are new clinics. The Northampton cancer clinic was approved July 9, the Beth Israel Hospital cancer clinic, September 10, Gloucester. September 10, Newburyport, September 10, and the Greenfield clinic was approved in November of 1934 but did not open until February of this year.

The Newton cancer clinic has been discontinued due to the small number of patients.

Berkshire County has been divided into the Pittsfield and North Adams clinics, and Worcester North into Gardner and Fitchburg. All of the seven hospitals in Worcester have united and have one clinic at the Memorial Hospital, and the three in Springfield have united and have one at the Springfield Hospital. In both of these latter places, members of the staffs from all of these hospitals unite in forming rotating groups.

TABLE IV. — *Massachusetts State-Aided Cancer Clinics*

CLINIC	Opening Date	Average Number of New Patients at Each Clinic Meeting
Beth Israel	Nov. 1, 1935	1.8
Boston Dispensary	July 1, 1928	3.0
Brockton	June 12, 1930	7.6
Fitchburg	Feb. 7, 1928	3.0
Gardner	Oct. 4, 1935[1]	2.5
Gloucester	Nov. 20, 1935	4.8
Greenfield	Feb. 1, 1935	1.5
Lawrence	Apr. 24, 1928	3.0
Lowell	May 27, 1927	3.5
Lynn	Apr. 14, 1927	6.2
New Bedford	Mar. 14, 1928	5.0
Newburyport	Dec. 11, 1935	6.0
North Adams	Sept. 25, 1935[2]	1.0
Northampton	Sept. 5, 1935	1.2
Pittsfield	May 31, 1928	4.2
Pondville	July 5, 1927	27.2
Springfield	Mar. 4, 1927	3.6
Worcester	Mar. 4, 1927	3.3

[1] Separated from Fitchburg on this date.

[2] Separated from Pittsfield on this date.

COOPERATIVE CANCER CONTROL COMMITTEES

In order to carry out our instructions to disseminate knowledge to every individual in the State a Cooperative Cancer Control Committee has been established or is in the process of being established in every one of the more than 350 communities. This committee is composed of a small central group or steering committee, and a larger group contacted directly by the central committee, and finally, every individual in the community. The steering committee is composed of key people who have friendly and vital contacts with every type of group and individual represented in the community—religious, political, labor, foreign, social, fraternal, patriotic, and service. The members of this steering committee contact representatives of every club in the community. These clubs promise to have at least one meeting a year on cancer. A club does not have to have an impressive membership to become corporate in this plan. The small group of eight or twelve is an ideal size. The group, itself, determines the type of cancer talk it will have. Some groups prefer a formal talk followed by a question period, while others prefer the round-table discussion with the physician during which questions are asked. In any case a question period is desirable. It is at these small group conferences in which an individual feels free to ask questions about cancer that the real basic educational work is done.

The local physician is the one who is asked to be the teacher in this program because the decline or increase in early detection of cancer is entirely in his hands; because he will obtain more cooperation from his community if it knows exactly what to do in case of early symptoms and what the early symptoms are; because the local physician knows his community; and because it has always been the natural prerogative of the physician to teach. The accompanying table shows the present status of the Cooperative Cancer Control Committees.

TABLE V.—*Cooperative Cancer Control Committee Organization*

COMMUNITIES ORGANIZED IN 1935	Date of Organization	Number of Organizations Cooperating
Agawam	Mar. 6	16
Amherst	June 24	23
Ayer	Nov. 12	13
Belchertown	June 26	15
Blandford	**	
Brimfield	Nov. 21	*
Brockton	July 22	42
Brookfield	Oct. 22	10
Cambridge	Nov. 22	69
Chester	Oct. 1	9
Chicopee	Apr. 24	*
Dana	**	
East Brookfield	Nov. 18	10
Easthampton	May 23	*
East Longmeadow	Mar. 25	10
Enfield	**	
Fitchburg	Nov. 14	*
Gardner	Nov. 5	*
Gloucester	Apr. 22	*
Granby	June 28	8
Granville	Apr. 26	1
Great Barrington	Oct. 22	*
Greenfield	Feb. 25	41
Greenwich	**	
Hadley	Dec. 12	7
Hampden	Apr. 10	15
Hardwick	Sept. 24	13
Hatfield	Dec. 5	6
Holbrook	June 4	*
Holland	**	
Holyoke	Mar. 12	55
Huntington	Sept. 10	8
Longmeadow	Mar. 7	9
Ludlow	Apr. 17	12
Lynn	Jan. 21	*
Monson	June 19	9
Montague	Feb. 25	9
Montgomery	**	
New Braintree	**	
Newburyport	May 22	11
North Adams	Mar. 25	*
Northampton	May 9	38
North Brookfield	Oct. 29	15
Palmer	Oct. 30	25
Pelham	June 25	2
Pittsfield	Mar. 11	49
Prescott	**	
Russell	May 22	5
Shelburne	Nov. 6	*
Southampton	May 14	8
Southbridge	Dec. 4	*
South Hadley	Apr. 30	*
Southwick	Apr. 10	8
Springfield	May 27	104
Sturbridge	Nov. 20	14
Wales	**	
Ware	Nov. 26	*
Warren	Oct. 18	20
West Brookfield	Oct. 21	11
Westhampton	**	
West Springfield	Feb. 26	*
Wilbraham	Apr. 12	6
Williamsburg	Dec. 11	14
Williamstown	Nov. 20	25
Winthrop	Mar. 6	*

* Completed lists of cooperating organizations not yet received.
** No formal meeting or committee, due to small size of community.

MAIL, PAMPHLETS, AND VISITORS

The average monthly incoming mail amounted to 492 pieces and outgoing mail 2,003 pieces. Over 41,000 pieces of literature have been distributed. These items show a considerable increase over those of the preceding year. The literature distributed included pamphlets on cancer, diabetes, rheumatism, heart disease, and other chronic diseases. Approximately thirty visitors per month came to the office for advice on various problems.

THE CANCER CLINIC BULLETIN

This monthly bulletin which was primarily designed for the physicians working in the cancer clinics is now mailed to about one fourth of the physicians in the State. It contains abstracts of articles on cancer and items of interest regarding the clinic program.

RADIO AND NEWSPAPER

The three radio broadcasts, Health Forum, Health Review, and Health Messages, have been continued during the year. Two articles from the Health Forum are printed weekly in the Boston *Globe* and one is sent to seventy-four newspapers throughout the State. During the year, 135 broadcasts have been given. This number includes four special broadcasts in Italian, three special E.R.A. broadcasts, and the special memorial broadcast of Dr. Bigelow by Dr. Anderson.

The radio number of *The Commonhealth* has been assembled by the Division.

LECTURES AND EXHIBITS

One hundred and fifty-nine lectures have been given to various groups in the State. The majority of these lectures were a part of the Cooperative Cancer Control Committee movement.

Exhibits were prepared for the Brockton Fair and for the annual meeting of the American Medical Association. The Division also assisted in the rheumatism exhibit for the annual meeting of the Massachusetts Medical Society.

TUMOR DIAGNOSIS SERVICE

The Tumor Diagnosis Service diagnosed 2,575 surgical specimens this year, an increase of 47 from the preceding year. Of these, 681 were sent in from the Huntington Hospital. The State-aided cancer clinics continued to send in a considerable number of specimens. There is a fairly steady increase in the number of inquiries from surgeons and others regarding the most satisfactory means of treatment of many types of tumor.

We are endeavoring to establish at least a partial follow-up of the most important types of cases so that we can more definitely answer some of the points brought to us to be settled.

The Service has been utilized very extensively by a number of the smaller hospitals near by as well as those in distant parts of the State. A list of the hospitals and the number of surgeons, by towns, who have sent us specimens is shown in Tables XVII and XVIII.

Publications from the laboratory for the year include "The Transplantation of Uninjured Tumor Cells" published in the NEW ENGLAND JOURNAL OF MEDICINE, 212 : 759, April 25, 1935; "Fibrosarcoma of the Soft Parts" to appear in ARCHIVES OF SURGERY.

The study of skin cancer has been further extended and many of the tumors from earlier years have been studied and reclassified. In view of the varying degree of radiosensitivity and response to surgical treatment in many tumors of this group, a thorough understanding of their histology is of importance both in prognosis and therapy.

Dr. George N. J. Sommer served as interne from January to July, 1935, and Dr. Paul W. Butterfield started his appointment as interne August 1, 1935, and will serve until July, 1936.

SOCIAL SERVICE

Social service has been continued as in former years in many of the clinics. In others it was felt more economical for the Department to furnish the part-time services of a social worker rather than have the clinic maintain its own. The Gardner, Greenfield, North Adams, Northampton, and Pittsfield cancer clinics are being cared for by one of the Department social workers and the Fitchburg, Gloucester, and Newburyport cancer clinics by another.

ASSISTANCE

Statistical assistance has been given to a number of physicians both in and out of Massachusetts. There has also been interdepartmental statistical assistance rendered. The Massachusetts Federation of Women's Clubs was assisted in securing speakers for several of its meetings.

Pondville Code

A large amount of work has been devoted to perfecting a punch-card code for the Pondville Hospital cancer patients. This has been attempted in previous years but could not be accomplished because of lack of space on the card. With the new eighty-line card it has been possible to prepare a code satisfactory to the surgeons at Pondville. Since July of this year the work has been progressing in transferring the information from the Pondville records to these codes. The work is necessarily slow, but the results should be very satisfactory.

Studies

Cancer and Tuberculosis: The death records have been collected and the tabulation of this data is in progress.

Rockefeller Study: Work on this study has been progressing. This includes investigation into the etiology of cancer and the evaluation of the cancer mortality records.

Changing Vital Statistics: An analysis of the changes in the Massachusetts vital statistics between 1850 and 1930 is being made.

Cancer Clinic Social Service Follow-Up: A study of the cancer patients from admission to death is being continued.

Diabetes: An intensive study of diabetes was made and a paper prepared.

Statistics of the State-Aided Cancer Clinics

Table VI. The attendance at the State-aided cancer clinics in 1935 was 3,655. More females attended the clinics than males. Cancer cases comprised 27.4 per cent of the total admissions. This increase over the preceding year was due to a larger percentage of total admissions being referred by physicians. One thousand and one individuals with cancer were seen. These individuals had 1,051 cancers and appeared 1,059 times at different clinics. The percentage of individuals with precancerous lesions was 8.5. Only about 4 per cent of the individuals who came to the clinics had no pathology. This figure is about the same as that for previous years. The median age of both the cancer patients and the total clinic attendance has remained practically constant throughout the nine years of clinic operation.

Table VII.—The number of cities and towns from which individuals came to the cancer clinics remained about the same.

Table VIII.—The median duration before the first visit by the patient to a physician showed little change between the years 1934 and 1935. A similar situation exists for duration before first visit to a cancer clinic. Evidently, continued efforts are needed to reduce the period of delay.

Table IX.—The percentage of cancer patients who came to the clinics referred by physicians has continued to increase, while the percentage referred by newspapers has decreased. In 1927 physicians referred 47.4 per cent of the cancer patients, while in 1935 this figure had increased to 74.0. Over half of the individuals with precancerous lesions were referred by physicians and about one twelfth by newspapers.

Table X.—The distribution of cancers coming to the clinics is shown in this table.

Table XI.—The diagnoses of previous years were changed in 1935 in 110 cases, and 17 diagnoses made in previous years which inadvertently had been omitted were recorded.

Table XII.—The contact of the patients with physicians is shown in this table. Of the total cancer patients coming to the clinics, 10.1 per cent had never consulted a physician, 13.4 per cent had consulted one or more physicians but had come of their own volition, 38.4 per cent had consulted one physician and were referred by him, and 33.5 per cent had consulted more than one physician and had been referred by the last one consulted. These figures differed little from those of the preceding year.

Table XIII.—The percentage of individuals who had never seen a physician prior to their clinic visit was less in 1935 than in 1934, which in turn was less than in 1933. There appears to be a steady increase in the percentage of cases coming to the clinics who have seen physicians.

Table XIV.—The symptoms that first brought patients to the clinics closely resembled those of previous years. It is encouraging to note a slight decrease in the percentage of the cancer patients who came because of pain.

Table XV.—The type of cancer by location, subdivided by the clinic's opinion as to the prognosis, is shown in this table.

Table XVI.—The diagnoses of various conditions found in the clinics are shown in this table. As some individuals had more than one condition, there were more diagnoses given than the total number of patients. Cancers comprised the largest percentage, with benign tumors second, and precancerous lesions third. Of the nonmalignant conditions, diseases of the digestive system, genitourinary system, and skin were the most common.

Table VI.—*Attendance at State-Aided Cancer Clinics, 1935*

Total individuals attending clinics	3,655
Total individuals having cancer	1,001
Total individuals having precancerous lesions	312
Total individuals having postoperative cancer, no evidence of recurrence	106
Total attendance at clinics	3,791
Total cancer attendance at clinics	1,059
Total precancer attendance at clinics	340
Total postoperative cancer, no evidence of recurrence, attendance at clinics	114
Total diagnoses	3,816
Total cancer diagnoses	1,051
Total precancer diagnoses	379
Total postoperative cancer, no evidence of recurrence, diagnoses	119
Percentage of individuals with cancer	27.4
Percentage of individuals with precancerous lesions	8.5
Median age of total clinic patients	52.0
Median age of cancer patients	62.9

Table VII.—*Residents of Massachusetts Cities and Towns Attending State-Aided Cancer Clinics*

	1934	1935
Number of places with 1 patient	56	44
Number of places with 2–5 patients	79	88
Number of places with 6–9 patients	35	36
Number of places with 10 patients and over	78	71
Total number of places	248	239

Table VIII.—*Median Duration in Months Between First Symptom and First Visit to Physician and First Visit to Clinic, by Location of Cancer*

Location of Cancer	Median Duration Before First Visit to Physician		Median Duration Before First Visit to Clinic	
	1934	1935	1934	1935
Buccal Cavity	5.0	4.4	7.4	6.4
Digestive Tract	4.0	4.1	6.1	7.5
Respiratory System	2.7*	3.0	7.0	7.5
Uterus	3.3	4.5	6.8	9.0
Other Female Genital Organs	6.3*	4.0*	7.5*	6.0*
Breast	5.6	4.1	6.6	6.8
Male Genitourinary Organs	4.0*	1.8*	12.5*	7.5
Skin	12.4	12.5	12.8	18.4
Other and Unspecified Organs	3.5	3.7	7.0	5.5
Total	6.3	6.1	9.2	9.4

* Based on less than 25 cases.

TABLE IX.—*Reason for Coming to Clinic, by Diagnosis*

Rate per 100*

REASON	CANCER		PRECANCEROUS LESIONS		ALL OTHERS		TOTAL	
	1934	1935	1934	1935	1934	1935	1934	1935
Physician	70.5	74.0	46.1	54.4	38.6	51.8	47.1	58.2
Past Experience or Former Patient	14.1	15.6	20.8	30.6	10.7	13.5	12.9	15.8
Newspapers	9.3	5.1	20.6	7.7	35.3	17.5	27.0	13.1
Friends or Relatives	6.1	5.3	9.7	8.2	10.7	11.8	9.5	9.7
Social Worker or Nurse	8.0	7.1	10.2	15.0	5.2	6.9	6.6	7.8
All Others	2.6	4.8	2.7	3.4	4.7	5.7	3.9	5.2

* Does not total to 100 per cent, as some individuals gave more than one reason.

TABLE X.—*Location of Cancer*

Rate per 100

LOCATION OF CANCER	1934	1935
Buccal Cavity	14.7	15.6
Digestive Tract	10.2	13.3
Respiratory System	2.8	3.1
Uterus	10.3	9.2
Other Female Genital Organs	1.2	2.3
Breast	15.9	15.4
Male Genitourinary Organs	3.2	3.2
Skin	37.6	32.4
Other and Unspecified Organs	4.1	5.5

TABLE XI.—*Correction in 1935 of Previous Years*

	Changed to Cancer	Changed from Cancer	Pondville Clinic Cases of Previous Years Recorded in 1935
Buccal Cavity	10	5	–
Digestive Tract	14	6	–
Respiratory System	1	1	–
Uterus	13	4	–
Other Female Genital Organs	3	–	–
Breast	15	6	–
Male Genitourinary Organs	3	–	–
Skin	11	8	2
Other and Unspecified Organs	6	–	–
Hodgkin's Disease and Leukemia	1	3	–
Precancerous Lesions	–	–	11
Postoperative Cancer, No Evidence of Recurrence	–	–	1
Benign Tumor	–	–	1
Diseases of the Genitourinary System	–	–	1
Other Digestive Diseases	–	–	1
Total	77	33	17

TABLE XII.—*Contact of Cancer Patients with Physician*

Rate per 100

	1934	1935
Referred by physician:		
One physician consulted	38.4	38.4
More than one physician consulted	30.6	33.5
Unknown	1.5	2.1
Not referred by physician:		
One or more physicians consulted	14.1	13.4
No physicians consulted	11.6	10.1
Unknown	3.8	2.5

TABLE XIII.—*Contact of Cancer Patients with Physician, by Location of Cancer*

Rate per 100

LOCATION OF CANCER	NO PHYSICIAN		ONE PHYSICIAN		TWO OR MORE PHYSICIANS	
	1934	1935	1934	1935	1934	1935
Buccal Cavity	13.7	13.1	47.9	48.4	38.4	38.5
Digestive Tract	3.8	0.7	40.4	44.5	55.8	54.8
Respiratory System	7.1	3.2	10.7	16.1	82.2	80.7
Uterus	2.0	5.4	54.9	38.1	43.1	56.5
Other Female Genital Organs	0.0	4.3	33.3	43.5	66.7	52.2
Breast	17.6	13.1	46.5	54.2	35.9	32.7
Male Genitourinary Organs	0.0	0.0	39.4	32.2	60.6	67.8
Skin	18.8	17.9	54.5	56.3	26.7	25.8
Other and Unspecified Organs	2.4	7.2	46.3	46.4	51.3	46.4
Hodgkin's Disease and Leukemia	0.0	0.0	40.0	33.3	60.0	66.7
Total	12.3	10.6	48.1	48.0	39.6	41.4

TABLE XIV.—*Symptoms that First Brought Patient to Clinic, by Diagnosis*

Rate per 100*

SYMPTOMS	1935		
	Cancer	Precancerous Lesions	Total
Swelling	34.5	20.8	33.1
Ulceration	35.0	29.3	19.0
Discharge and Bleeding	15.6	12.6	17.0
Pain	24.5	20.5	31.4
Deformity	6.8	35.1	11.6
Loss of Weight	10.2	2.4	8.4
Malaise	3.1	1.1	4.1
Observation	1.2	1.1	1.8
Itching	1.8	2.4	2.0
Scaly Skin	1.0	1.8	0.8
Others	13.1	5.5	12.8
Unknown	0.0	0.0	0.1

* Does not total to 100 per cent, as multiple symptoms were given by some patients.

TABLE XV.—*Type of Cancer, by Location of Cancer and Sex*

Rate per 100

LOCATION OF CANCER	OPERABLE CANCER PROBABLE CURE		OPERABLE CANCER POSSIBLE CURE		OPERABLE CANCER PALLIATIVE MEASURES ONLY		INOPERABLE CANCER	
	1934	1935	1934	1935	1934	1935	1934	1935
MALES								
Buccal Cavity	40.7	44.0	29.6	34.0	17.8	15.6	11.9	6.4
Digestive Tract	3.0	5.7	31.3	26.1	31.3	25.0	34.4	43.2
Respiratory System	0.0	11.1	13.0	14.8	43.5	25.9	43.5	48.2
Breast	25.0	0.0	50.0	50.0	25.0	0.0	0.0	50.0
Male Genitourinary Organs	9.7	6.1	22.6	21.2	41.9	33.3	25.8	39.4
Skin	82.2	81.2	14.7	17.4	2.2	1.0	0.9	0.5
Other and Unspecified Organs	10.0	14.3	25.0	21.4	10.0	25.0	55.0	39.3
Total	49.1	46.2	22.0	23.9	15.0	13.4	13.9	16.5
FEMALES								
Buccal Cavity	54.5	44.4	27.3	38.8	9.1	5.6	9.1	11.1
Digestive Tract	8.8	6.7	44.1	37.8	20.6	24.4	26.5	31.1
Respiratory System	25.0	33.3	0.0	0.0	0.0	33.3	75.0	33.3
Uterus	7.0	11.0	42.0	38.5	26.0	26.4	25.0	24.2
Other Female Genital Organs	16.7	8.7	25.0	30.4	25.0	39.1	33.3	21.8
Breast	19.5	17.0	41.6	42.5	18.8	18.9	20.1	21.6
Skin	85.6	78.4	13.0	16.8	0.7	4.0	0.7	0.8
Other and Unspecified Organs	10.0	14.8	30.0	14.8	20.0	29.6	40.0	40.8
Total	37.4	31.4	31.3	32.2	14.5	18.1	16.8	18.3

TABLE XVI.—*Diagnosis**

Rate per 100

DIAGNOSIS	1934	1935
Cancer primary	16.1	18.5
Cancer with metastases	4.7	6.2
Cancer recurrent following operation	2.3	2.5
Original diagnosis non-cancer, changed to cancer	0.4	0.4
Cancer recurrent, formerly postoperative cancer	0.07	0.08
Precancerous lesions, changed to cancer	0.3	0.2
Diagnosed cancer at death	0.07	0.03
Original diagnosis non-cancer, diagnosed cancer of same site at death	0.05	0.03
Hodgkin's disease, changed to cancer	0.02	0.0
Original diagnosis non-cancer, changed to Hodgkin's disease	0.02	0.05
Hodgkin's disease and leukemia	0.5	0.7
Original diagnosis cancer, changed to Hodgkin's disease	0.0	0.03
Postoperative cancer, no evidence of recurrence	2.6	3.2
Benign tumors	16.7	14.6
Precancerous lesions	15.0	10.2
Original diagnosis cancer, changed to precancerous lesions	0.0	0.2
Original diagnosis cancer, changed to non-cancer	0.7	0.8
Original diagnosis cancer recurrent, changed to postoperative cancer	0.0	0.08
Diseases of the digestive system	9.1	8.0
Diseases of the circulatory system	1.2	1.5
Diseases of the genitourinary system	6.9	8.1
Diseases of the respiratory system	0.7	0.4
Diseases of the nervous system	1.4	0.7
Diseases of the skin	5.8	8.1
Mouth lesions	2.4	2.8
Diseases of the bone	0.6	0.5
Diseases of the eye and ear	0.4	0.2
Tuberculosis	0.4	0.7
Diabetes	0.2	0.2
Pernicious anemia	0.1	0.05
Rheumatism	0.2	0.4
Goitre	0.3	0.2
Syphilis	0.4	0.5
Endocrine dysfunction	0.05	0.2
Undiagnosed	0.3	2.7
Deferred	4.3	2.1
No pathology	4.1	4.6
Non-cancer, diagnosis not established	1.1	1.2
All others	5.2	3.4

* Does not total to 100 per cent, as some individuals had more than one diagnosis.

TABLE XVII.—*Tumor Diagnosis Service, 1935*

Specimens were received from hospitals listed below:

Acushnet Sanitarium and Hospital, New Bedford
Angell Memorial Hospital, Boston
Audubon Hospital, Boston
Ayer Community Memorial Hospital, Ayer

Barr Sanitarium, Lawrence
Bay State Hospital, Boston
Benson Hospital, Haverhill
Boston City Hospital
Brockton Hospital, Brockton
Burbank Hospital, Fitchburg

Cable Memorial Hospital, Ipswich
Cambridge Relief Hospital, Cambridge
Cape Cod Hospital, Hyannis
Carney Hospital, Boston
Central Hospital, Somerville
Charlesgate Hospital, Cambridge
Chelsea Marine Hospital, Chelsea
Chester Hospital, Cambridge
Chestnut Street Hospital, Milford
Chicopee Hospital, Chicopee
Choate Memorial Hospital, Woburn
Clinton Hospital, Clinton

Table XVII.—*Tumor Diagnosis Service, 1935*—Continued

Clover Hill Hospital, Lawrence
Cohasset Hospital, Cohasset
Commonwealth Avenue Hospital, Boston
Community Memorial Hospital, Ayer
Cooley Dickinson Hospital, Northampton
Cousen's Hospital, Waltham

Danvers State Hospital, Hathorne
Dedham Emergency Hospital, Dedham
Dover Street Clinic, Boston
Ducy Hospital, Brockton

Eaton Hospital, Brockton

Fairlawn Hospital, Worcester
Fairview Hospital, Great Barrington
Fenway Hospital, Boston
Forest Hills Hospital, Jamaica Plain

Gale Hospital, Haverhill
Gardner State Colony, Gardner
Glover Memorial Hospital, Needham
Glynn Hospital, Dorchester

Haverhill Municipal Hospital, Haverhill
Henry Heywood Hospital, Gardner
Hillcrest Hospital, Pittsfield
Holbrook Hospital, Holbrook
Holden District Hospital, Holden
Holyoke Hospital, Holyoke
Homberg Infirmary, Boston
House of Mercy Hospital, Pittsfield

Jordan Hospital, Plymouth

Lawrence City Hospital, Lawrence
Lawrence General Hospital, Lawrence
Lawrence Municipal Hospital, Lawrence
Leominster Hospital, Leominster
Louis Pasteur Hospital, Worcester
Lowell General Hospital, Lowell
Ludlow Hospital, Ludlow
Lynn Hospital, Lynn

MacLeod Hospital, Boston
Malden Hospital, Malden
Martha's Vineyard Hospital, Martha's Vineyard
Mary Alley Hospital, Marblehead
Mary Lane Hospital, Ware
Massachusetts General Hospital, Boston
Massachusetts Hospital School, Canton
Massachusetts Osteopathic Hospital, Jamaica Plain
Memorial Clinic, Inc., Holyoke
Mercy Hospital, Springfield
Metropolitan State Hospital, Waltham
Middlesex Hospital, Cambridge
Miller's River Hospital, Winchendon
Milton Hospital, Milton
Monson State Hospital, Monson
Moore Hospital, Brockton

TABLE XVII.—*Tumor Diagnosis Service, 1935*—Concluded

Morton Hospital, Taunton
Mt. Hope Hospital, Taunton
Murdock Hospital, Brockton

Nantucket Cottage Hospital, Nantucket
New England Sanitarium, Melrose
Noble Hospital, Westfield
North Adams Hospital, North Adams
North Reading State Sanatorium, North Reading
Norwood Hospital, Norwood

Ocean View Hospital, Lynn

Plymouth County Hospital, Plymouth
Providence Hospital, Holyoke

Roxbury Hospital, Roxbury

St. John's Hospital, Lowell
St. Joseph's Hospital, Lowell
St. Luke's Hospital, Middleborough
Sassaquin Sanatorium, New Bedford
Somerville Hospital, Somerville
Springfield Hospital, Springfield
State Farm, State Farm
State Prison Colony, Norfolk
State School, Belchertown
Dr. Street's Private Hospital, Conway
Sturdy Memorial Hospital, Attleboro
Sunnyside Hospital, Somerville

Trumbull Hospital, Brookline

Union Hospital, Lynn
Union Hospital, New Bedford
United States Navy Station Hospital, Fort Banks

Wesson Memorial Hospital, Springfield
Whitinsville Hospital, Whitinsville
Wing Memorial Hospital, Palmer
Winthrop Community Hospital, Inc., Winthrop
Worcester City Hospital, Worcester

TABLE XVIII.—*Tumor Diagnosis Service, 1935*

CITY OR TOWN	Surgeons Sending in Specimens	CITY OR TOWN	Surgeons Sending in Specimens
Athol	2	Nahant	1
Attleboro	1	Nantucket	1
		Needham	1
Belmont	1	New Bedford	9
Beverly	2	New Marlborough	1
Boston	60	Northampton	1
Bridgewater	1	North Andover	2
Brockton	7	North Attleborough	1
Brookline	1	Northbridge	1
		Norwood	1
Cambridge	2		
Chelsea	2	Oak Bluffs	1
Clinton	1		
Conway	2	Palmer	2
		Peabody	2
Danvers	1	Pittsfield	4
Dedham	1	Plymouth	5
Fitchburg	1	Quincy	2
Framingham	1		
		Revere	2
Gardner	1		
Georgetown	2	Salem	4
Grafton	1	Scituate	1
Greenfield	1	Somerville	10
Groton	1	Springfield	4
Groveland	1	Stoneham	1
		Stoughton	1
Haverhill	8		
Holyoke	4	Taunton	4
		Templeton	1
Lawrence	11		
Lee	1	Uxbridge	1
Longmeadow	1		
Lowell	4	Waltham	1
Ludlow	1	Ware	1
Lynn	24	Wareham	1
		Watertown	1
Malden	2	Westfield	3
Mansfield	2	Weymouth	3
Mattapoisett	1	Winchendon	3
Medford	3	Winthrop	1
Methuen	2	Woburn	1
Milford	4	Worcester	7
Monson	1		
		Total	248

REPORT OF DIVISION OF BIOLOGIC LABORATORIES

Elliott S. Robinson, M.D., Ph.D., *Director*
Roy F. Feemster, M.D., *Assistant Director*

During the year 1935 much attention has been devoted to a survey of our distribution methods and the initiation of changes suggested by this survey. In the past, reliance has been placed on the assumption that local agencies would order adequate supplies of biologic products; but this assumption proved to be only in part correct. The survey indicated, too, that certain communities were carrying unreasonably large stocks of products or were maintaining too many distribution points, resulting in a considerable wastage of products. To remedy the defects noted and to conserve products, each local board of health in the larger communities now orders all supplies for that community through its own office or an agency, usually a hospital or drug store. This gives the local boards of health reliable information of the volume of orders from their towns, and has already resulted in some decrease in the quantities of products needed. These boards of health have been visited by the district health officers, who have suggested possible improvements in the local distribution systems. Near-by hospitals and physicians are still supplied directly by the laboratory, if they wish to send for products; but no products for the larger towns are sent by mail, except to board of health agencies.

The distribution of antimeningococcic serum has been treated differently. About sixty hospitals have been selected as distributing stations for this product; and fresh supplies are sent to these hospitals when our records indicate that their stock has become out-dated. This method will not result in a marked reduction of the amount of serum distributed, but should make it readily available when needed.

The full effect of these changes will not be apparent for another year, for they were not instituted until the early part of the summer.

The Pneumonia Study and Service carried on under a grant from the Commonwealth Fund of New York City came to an end December 31, 1935; but plans have been made to continue the major part of the work as a regular function of the laboratory. Enough personnel have been taken over to continue the production of the serum, which will be distributed through hospital laboratories equipped to do pneumococcus typing. Serum will be distributed only under certain restrictions, for it is still an expensive product and difficult to make. Our experience with this study indicates the desirability of such an arrangement in the investigation of new products, for it gave us an adequate staff free to devote its entire attention to investigation of the very difficult problems involved. By no means did all of these problems reach a satisfactory solution, but sufficient progress was made to demonstrate the efficacy of serum treatment for Type I and II pneumococcus lung infections and the feasibility of production of the serum by this laboratory.

ANTITOXIN AND VACCINE LABORATORY

1. *Distribution of Products*

Diphtheria	1931	1932	1933	1934	1935
Antitoxin, 1,000 unit doses	212,601	195,648	164,587	141,238	103,152
Schick Outfits, 50 doses each	8,503	7,748	7,100	7,084	5,954
Toxin-Antitoxin Mixture, 1 cc. doses	474,881	420,003	461,930	373,467	214,817
Toxoid, 1 cc. doses	–	1,557	22,002	125,731	209,760
Toxoid (Bulk) cc.	3,600	1,100	–	–	–
Toxoid, Alum Precipitated, 1 cc. doses	–	–	–	–	110
Toxin (Bulk) cc.	175	265	10	175	115
Scarlet Fever					
Convalescent Serum, vials	–	–	231	605	302
S. F. Streptococcus Antitoxin, doses	3,433	–	2,207	2,568	2,490
S. F. Streptococcus Toxin, 5 cc. vials	–	–	128	700	718
S. F. Streptococcus Toxin, Heated Control, 5 cc. vials	–	–	–	–	256
S. F. Streptococcus Toxoid, 1 cc. doses	–	–	563	21,156	27,406

Pneumonia	1931	1932	1933	1934	1935
Antipneumococcic Serum, Conc., vials	1,392	2,609	2,957	2,382	3,717
Diagnostic Serums					
Pneumococcus Type I—horse, cc.	415	1,015	1,270	550	565
Pneumococcus Type II—horse, cc.	290	975	1,205	535	590
Pneumococcus Type III—horse, cc.	255	1,080	1,325	620	620
Pneumococcus Type V—horse, cc.	–	325	300	10	–
Pneumococcus Type I—rabbit, cc.	–	–	57	172	240
Pneumococcus Type II—rabbit, cc.	–	–	57	146	220
Pneumococcus Type III—rabbit, cc.	–	–	57	159	194
Pneumococcus Type V—rabbit, cc.	–	–	–	20	49
Pneumococcus Type VIII—rabbit, cc.	–	–	–	10	56
Measles					
Diplococcus Serum, vials	447	–	–	–	–
Placental Extract, vials	–	–	–	36	7,490
Sodium Citrate Solution, vials	1,563	896	1,230	1,784	1,707
Meningitis					
Antimeningococcic Serum, 15 cc. doses	3,577	3,530	2,960	2,959	3,640
Antimeningococcic Serum, Conc. 15 cc. doses	115	–	–	–	29
Influenza (Pfeiffer Bacillus) Antiserum, vials	481	573	757	913	1,128
Influenza (Pfeiffer Bacillus) Antiserum (Bulk) cc.	–	–	–	200	–
Miscellaneous Serums					
Typhus Serum, 20 cc. vials	–	40	20	667	418
Typhus Serum (Bulk) cc.	–	–	100	100	–
Calf Serum, vials	–	–	–	40	–
Horse Serum, Normal, cc.	51,375	31,395	20,865	19,960	29,959
Human Serum, Normal, vials	–	–	22	45	–
Poliomyelitis					
Convalescent Serum, vials	–	714	951	502	1,276
Enteric Fevers					
Typhoid-Paratyphoid Vaccine, 1 cc. doses	94,635	88,908	89,297	98,412	95,356
Diagnostic Serums					
Typhoid, cc.	10	26	22	14	10
Paratyphoid A, cc.	15	32.5	25	15	10
Paratyphoid B, cc.	20	35	25	15	10
Flexner Dysentery Vaccine (dried), capsules	–	–	–	4,000	6,000
Flexner Dysentery Vaccine, 20 cc. vials	–	–	–	10	–
Other Products					
Smallpox Vaccine, capillary tubes	290,824	350,727	274,957	289,981	256,584
Tuberculin (ampoules—1.5 cc.)	734	1,925	2,362	3,630	4,050
Tuberculin (bulk) cc.	100	550	–	–	–
Silver Nitrate Solution (ampoules)	64,423	61,586	60,399	60,284	59,164
Typhoid-H antigen, 5 cc. vials	–	–	–	–	160
Syphilis					
Arsphenamine, 0.3 gram (ampoules)	150	10	339	–	–
Arsphenamine, 0.4 gram (ampoules)	384	590	202	125	109
Arsphenamine, 0.6 gram (ampoules)	903	1,520	1,602	1,119	1,350
Arsphenamine, 2.0 gram (ampoules)	25	–	–	–	–
Arsphenamine, 3.0 gram (ampoules)	2,815	2,510	2,280	2,440	2,095
Sulpharsphenamine, 0.3 gram (ampoules)	3,552	1,676	2,045	1,780	1,932
Sulpharsphenamine, 0.4 gram (ampoules)	1,688	1,526	1,382	660	997
Sulpharsphenamine, 0.6 gram (ampoules)	11,575	7,033	4,655	4,800	3,127
Sulpharsphenamine, 1.0 gram (ampoules)	1,591	1,108	200	260	353
Sulpharsphenamine, 3.0 gram (ampoules)	1,253	661	268	180	100
Neoarsphenamine, 0.45 gram (ampoules)	10,228	8,606	12,320	14,948	16,610
Neoarsphenamine, 0.6 gram (ampoules)	23,929	26,099	32,050	32,170	35,060
Neoarsphenamine, 0.9 gram (ampoules)	8,649	9,203	13,880	18,200	18,520
Mapharsen, 0.04 gram (ampoules)	–	–	–	–	150
Mapharsen, 0.06 gram (ampoules)	–	–	–	–	150

1. *Diphtheria Antitoxin.*—The distribution of this product continues to decrease as the incidence of the disease diminishes. The proportionate decrease in distribution is, however, larger than for any year since 1928, the year in which distribution began its present downward trend. It is of interest that we have no horses on diphtheria antitoxin production for the stock on hand is sufficient for our present needs.

2. *Schick Outfits.*—Most of the decrease in distribution has followed the change in the distribution system.

3. *Diphtheria Toxin-Antitoxin Mixture and Diphtheria Toxoid.*—The number of doses of these products distributed for 1935 is about seventy-five thousand less than for 1934, although the amount of toxoid distributed has increased two-thirds. There was much less immunization work done during the summer of 1935 than in the corresponding period of the year before, when several communities did this under E.R.A. programs.

4. *Antipneumococcic Serum.*—For 1935 the number of vials distributed is more than 50 per cent higher than for 1934 and over 25 per cent higher than for 1933, the previous high year. Most of the serum has been bivalent (Types I and II) but some lots have been distributed as monovalent because of a low titer in the other type of antibody.

5. *Placental Extract.*—This is used in connection with the study mentioned below.

6. *Dysentery Vaccine.*—This has been distributed to certain mental disease hospitals which have shown an interest in its use.

7. *Smallpox Vaccine.*—Elimination of the packages containing five and twenty-five doses and the changes in methods of distribution have decreased the distribution of this product over 10 per cent, to a level below any year of the last ten.

8. *Tuberculin.*—There is still an increasing distribution of this product.

2. *Expenses*

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1931	$71,000 00	$70,984 35	$42,556 90	$42,504 57	$113,556 90	$113,488 92
1932	71,500 00	71,481 70	37,314 70	35,528 06	108,814 70	107,009 76
1933	66,860 00	65,699 94	34,768 41	31,945 31	101,628 41	97,645 25
1934	63,530 00	62,478 89	38,234 98	33,417 44	101,764 98	95,896 33
1935	70,970 00	69,976 74	37,662 06	33,768 19	108,632 06	103,744 93

The increased amount spent for personal services is due in part to the taking over of personnel from the Pneumonia Service and in part to general salary increases. The increase in other expenses is more than accounted for by payment made on the sprinkler system mentioned in the last annual report.

3. *Improvements*

In addition to the ordinary maintenance work, the physical plant has been improved by the replacement of the horse yard fence, and of part of our refrigeration machinery. The equipment of the laboratory has been augmented by the acquisition of a high-speed centrifuge, primarily for use in the preparation of placental extract.

4. *Personnel*

The transfer of personnel from the Pneumonia Study and Service has added one Senior and one Junior Bacteriologist and one Laborer to our list, the previous incumbents being continued in these positions. A Junior Bacteriologist has been placed in charge of the filling and distributing group; but this change did not increase the number of employees for it was made following the resignation of a Laboratory Helper. One position in the stable has been left unfilled and is now discontinued because of the smaller number of horses under immunization. The number and grades of positions at the end of the fiscal year is: 1 Director, 1 Assistant Director, 4 Senior Bacteriologists, 1 Senior Chemist, 1 Assistant Bacteriologist, 1 Assistant Chemist, 4 Junior Bacteriologists, 3 Laboratory Assistants, 8 Laboratory Helpers, 1 Principal Clerk and Stenographer, 1 Senior Clerk, 1 Junior Clerk and Stenographer, 3 Junior Messengers, 1 Stable Foreman, 2 Janitors and 14 Laborers.

5. *Educational Activities*

The educational activities of the Laboratory have been carried on as usual through demonstrations for medical and public health students, attended by 296, through a course in Applied Immunology, and through participation in the Simmons College graduate course for Laboratory Technician training. The Director and Assistant Director gave four talks at various places, attended by about 300 people. Laboratory workers from France, Hungary, Mexico and South Africa visited the Laboratory. Material was prepared for several broadcasts.

6. *Investigations*

(*a*) The preparation and use of scarlet fever streptococcus toxoid is still under investigation. The use of this product is discussed in the report of the Division of Communicable Diseases.

(*b*) The study of diphtheria toxoid, alum precipitated, has been interrupted because of serious doubts of the value of this product. A small quantity has been made and is under clinical trial. Until more definite evidence is available concerning the immunizing value of this agent and its freedom from unpleasant reactions, no attempt will be made to further its use.

(*c*) The use of placental extract in the prevention of measles is proving satisfactory, but the methods of manufacture and particularly of standardization leave much to be desired. This study is being continued in association with the Department of Pediatrics of the Harvard Medical School. The results up to that time were presented at the American Public Health Association meeting in October.

(*d*) The immunizing value of typhoid vaccine as ordinarily prepared has been questioned during the past few years. A study of this problem has been started, with particular reference to the protective value of our vaccines against infections in mice. An investigation of methods of standardizing the bacterial content of these vaccines is nearing completion.

(*e*) The Pneumonia Study and Service has continued its researches during the past year. A paper on the monkey test for chill-producing activity of concentrated serums has been published and one on the potency-testing of unconcentrated serum has been prepared and will be published shortly. A paper on a strain of Escherichia coli which has a serological relationship to Pneumococcus Type I has already appeared. Work is in progress on the possible transformation of a Type V to a Type II pneumococcus, and on methods of serum concentration.

(*f*) From data obtained by a questionnaire and from the literature a circular has been prepared on the precautions to be observed in the administration of serum. This circular is distributed with each vial of serum, and is intended as a guide to those physicians who have relatively little occasion to administer serum.

7. *Publications*

The five papers mentioned in the 1934 report as accepted for publication appeared in 1935, as well as those listed on page 20 of this report.

The following papers have been accepted for publication but will appear after the close of the year:

1. Barnes, L. A., Clarke, Charlotte M., and Wight, Eleanor C.: Comparisons of various methods for the routine titration of Types I and II antipneumococcic horse serums. Jour. Immunol.
2. Barnes, L. A., and Robinson, Elliott S.: Monkey Test for Chill-Producing Activity of Concentrated Antipneumococcic Serum. Am. Jour. Pub. Health, Vol. 26, No. 1, January, 1936, p. 51.

8. *Inspection*

Inspections by the United States Public Health Service were made by Dr. M. V. Veldee on June 19 and by Dr. G. W. McCoy on October 28, 1935. The U. S. Treasury Department license to manufacture and sell biologic products was continued.

II. Wassermann Laboratory

William A. Hinton, M.D., *Chief of Laboratory*

1. *Tests and Examinations*

The increase in number of tests performed has been resumed, following its interruption last year because of a change in the routine method of testing of blood for evidence of syphilis. The number of tests performed in 1935 shows an increase of nearly six per cent and the number of specimens submitted for serological examination for evidence of syphilis an increase of about twelve per cent (1934—119,819 specimens; 1935—133,488). The number of tests for the Division of Live Stock Disease Control again shows a notable increase.

	1931	1932	1933	1934	1935
Wassermann Tests	97,444	100,948	106,211	40,125	17,477
Kahn Tests	12,735	15,059	18,541	4,260	–
Hinton Tests	15,412	22,167	30,371	95,036	127,488
Gonococcus Fixation Tests	2,560	3,195	3,657	4,343	5,209
Lange's Colloidal Gold Tests	79	107	106	178	158
Complement Fixation Tests for Glanders	32	27	74	37	29
Specimens of Milk Examined for Tuberculosis	1	–	–	–	–
Agglutination Tests for Brucella Abortus	–	258	–	–	–
Diagnostic Examinations for Division of Live Stock Disease Control:					
(a) Complement Fixation Tests for Glanders	13	5	11	17	12
(b) Examination for Rabies	515	265	301	496	491
(c) Pathologic and Bacteriologic Examinations	32	22	21	14	5
(d) Agglutination Tests for Brucella Abortus	8,966	10,077	11,921	14,653	17,701
	137,789	152,130	171,214	159,159	168,570

2. *Expenses*

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1931	$16,600 00	$16,591 76	$5,213 34	$5,213 34	$21,813 34	$21,805 10
1932	17,000 00	16,409 86	5,200 80	5,144 12	22,200 80	21,553 98
1933	15,990 00	15,654 38	5,000 00	4,916 27	20,990 00	20,570 66
1934	15,700 00	15,498 99	5,219 45	5,142 48	20,919 45	20,641 47
1935	16,990 00	16,580 64	5,201 00	5,188 25	22,191 00	21,768 89

Expenses for salaries increased in 1935 because of increases granted individual employees and because of the addition of a Laboratory Helper to the staff. The average cost per test remained low, however, at slightly over 13 cents per test.

3. *Education*

In addition to the routine activities, the Wassermann Laboratory has furnished instruction to men in the second-year class of the Harvard Medical School, and cooperated with its Department of Medicine in a serological investigation in relation to nephritis. There was also a special class of fourteen senior students from Simmons College; and instruction was given to six special students from the graduate department of Simmons College.

REPORT OF DIVISION OF CHILD HYGIENE

M. Luise Diez, M.D., *Director*

The activities of the Division of Child Hygiene for the year ending December 31, 1935, were chiefly the following:

I. Activities of the Various Sections:

1. *Maternal, Infant and Preschool Hygiene:*
    - (*a*) Maternity Service
    - (*b*) Maternity Institutes
    - (*c*) Mothers' Classes
    - (*d*) Well Child Conferences
    - (*e*) Summer Round-Up
    - (*f*) Emergency Relief Administration Nursery Schools
2. *School Hygiene:*
    - (*a*) Millville
    - (*b*) Health Awareness Test
    - (*c*) Health Education in Secondary Schools
    - (*d*) School Hygiene Surveys
    - (*e*) "Contact"
3. *Public Health Nursing:*
    - (*a*) Tuberculosis Nursing
    - (*b*) Communicable Disease Nursing
    - (*c*) School Nursing
    - (*d*) Hospital Training Schools
    - (*e*) Home Hygiene Classes
    - (*f*) Continuation Classes
    - (*g*) Public Health Nursing Institutes
    - (*h*) Scholarships for Nurses
    - (*i*) School Lunch Survey
    - (*j*) Health Clubs
    - (*k*) General Nursing Service
4. *Nutrition:*
    - (*a*) Nutrition Advisory Committee
    - (*b*) Changes in Nutrition Staff
    - (*c*) Community Nutritionist
    - (*d*) School Lunches
    - (*e*) Well Child Conferences
    - (*f*) Community Dental Nutrition Service
    - (*g*) Parent Education
    - (*h*) Nutrition Education for Professional Workers
    - (*i*) Welfare
    - (*j*) Emergency Relief Administration and Works Progress Administration
    - (*k*) Scurvy Study
    - (*l*) Sanatoria
    - (*m*) Summer Camps
5. *Dental Hygiene:*
    - (*a*) Dental Certificate Program
    - (*b*) Dental Clinics
    - (*c*) Preschool Program
    - (*d*) "Protect Your Smile"
    - (*e*) New Dental Service
    - (*f*) General

6. *Health Education:*
    - (*a*) Courses in "Charm"
    - (*b*) Publicity
    - (*c*) Play Day—Child Health Day
    - (*d*) Pamphlets, Posters, Exhibits
    - (*e*) Library
    - (*f*) Lectures, Motion Pictures, etc.
    - (*g*) Prenatal and Postnatal Letters and Fathers' Letter
    - (*h*) Cooperation with Outside Agencies
    - (*i*) Staff Education

II. SPECIAL PROJECTS:
1. Emergency Relief Administration Nursing Services
2. Works Progress Administration

III. PERSONNEL OF THE DIVISION.

I. ACTIVITIES OF THE VARIOUS SECTIONS

1. Maternal, Infant and Preschool Hygiene:

(*a*) *Maternity Service:*

At the close of the calendar year there were on the registry for the monthly prenatal letters, and letter to fathers, approximately 860 names; for the first-year postnatal service, 12,826 names, and for the second-year postnatal service, a total of 12,454 names. This makes a total of 26,140 names of prospective parents and mothers of children under two years of age who received instruction in prenatal care and care of the baby during 1935.

At the Framingham Reformatory for Women a conference was held with the resident staff of the Reformatory and the pediatrician, public health nursing consultant and nutritionist of the Department of Public Health. Plans were made for home visiting by local nurses upon the mothers and children who were discharged from the Reformatory during the year. In several instances this visiting service was given by the Department Nursing Consultants.

(*b*) *Maternity Institutes:*

A series of eight two-day Maternity Institutes was held for the nurses of the State, under the auspices of The Commonwealth Fund and the State Department of Public Health. These were held in Pittsfield, Greenfield, Springfield, Worcester, Lowell, Boston, Harwichport and Taunton. The total attendance at all Institutes was 712, representing 145 cities and towns of the State.

(*c*) *Mothers' Classes:*

The Public Health Nursing Consultants of the Division assisted the local communities in the formation of Mothers' Classes and in the continuance of classes already established. This type of instruction in maternal and child care meets a need and is well received in many communities. Definite interest was aroused in this activity in Nantucket in conjunction with the prenatal clinics held at the local hospital; and new classes were established in the town of Hamilton.

(*d*) *Well Child Conferences:*

Well Child Conferences were conducted by the Division staff in 20 towns in two of which the children examined were only those who would enter school for the first time in the fall. At another conference, held in Chicopee, only the children attending the nursery schools were examined. The total number of examinations made was 1,333, the physician of the Division staff examining 1,167 of these and another physician examining the remaining 166 children at conferences where the other members of the Department Conference Unit assisted.

A total of 217 towns in the State have had State Demonstration Well Child Conferences conducted by the Department staff. In 51 of these communities local Well Child Conferences are now held with a physician in charge, and 16 communities hold such conferences with a nurse only in charge. In 52 additional towns local conferences are held with a physician in charge and 21 with a nurse only in charge, none of these communities having had the Demonstration Well Child Conference of the Department. Many have, however, received advice and assistance from the Division of Child Hygiene in the organization of their conferences.

A summary of the Well Child Conference examinations for the years 1931 to 1935, inclusive, gives the following information:

TABLE I—*Summary of Examinations*

YEAR	NUMBER EXAMINED		NUMBER WITH DEFECTS		PERCENTAGE WITH DEFECTS	
	Pre-school	Entering School	Pre-school	Entering School	Pre-school	Entering School
1931 . .	973	192	631	176	65	92
1932 . .	1,243	627	888	607	71	97
1933 . .	1,100	549	900	518	82	94
1934 . .	989	510	835	493	85	97
1935 . .	709	625	600	591	85	95

TABLE II—*Defects Found*

YEAR	TEETH		NUTRITION		ALL OTHER DEFECTS	
	Pre-school	Entering School	Pre-school	Entering School	Pre-school	Entering School
1931 . .	159	93	129	23	614	305
1932 . .	273	454	203	421	1,020	982
1933 . .	332	391	366	322	1,374	1,087
1934 . .	391	377	342	283	1,267	1,026
1935 . .	303	483	204	393	1,107	1,013

The Well Child Conference figures for the year 1935 are as follows:

Number of Well Child Conferences held during 1935	20
Number of children examined	1,102
Number of examinations	1,333

In Northampton, Southampton, Westhampton and Williamsburg the three-year demonstration Well Child Conferences were completed. In Northampton the Well Child Conference will be carried on, in one section at least, by the Parent-Teacher Association. The other three towns have requested partial assistance for the coming year with the prospect of this activity being taken over wholly by the towns later.

In Nantucket assistance was given at a conference where the physician was employed by the local organizations, and 152 children were examined.

On Martha's Vineyard three towns employed a physician for the examinations at the conferences which served Edgartown, Oak Bluffs and Vineyard Haven, this Department giving the assistance of the other members of the Conference staff.

In 15 towns the pediatrician of the Well Child Conference staff gave talks on preschool and infant hygiene. A special series of talks was given at five of the State Teachers Colleges, to the nursery school teachers under the Emergency Relief Administration, and in four schools in Newton to the Women's Americanization Classes.

In Amherst and South Hadley the Well Child Conference was held for the first time by the Division Unit.

In Seekonk a prenatal program was inaugurated, the Consultant in Public Health Nursing for the district assisting the local nurse in the proper procedure for urinalysis, taking of blood pressure and content of nursing visits. A two-day Well Child Conference held in Seekonk was very successful and plans were made for future conferences.

In the western part of the State nine towns were served by the complete Conference Unit of the Division and two towns received part service from the Unit. Follow-up visits were made to the homes of fifteen children examined at these conferences in the interest of the correction of physical defects, including nutrition defects.

In Williamsburg schools, in the first three grades, the school physician found the children in splendid physical condition, the result, he believes, of the Well Child Conferences held there in previous years.

(*e*) *Summer Round-Up:*

The usual cooperation was afforded the local Parent-Teacher Associations and other local organizations and nurses in providing printed material and advice for the conduct of the Summer Round-Up activities locally. Reports were received from 167 towns conducting Summer Round-Up examinations during 1934, and 16.6 per cent of entering school children in these towns were admitted for examination.

(*f*) *Emergency Relief Administration Nursery Schools:*

An outstanding activity of the Emergency Relief Administration was the formation of Preschool Centers and Nursery Schools as local projects. The staff of the Division of Child Hygiene was called upon frequently to participate in this activity. Surveys were made of these centers by the Consultant Nurses in 76 communities of the State and talks were given for nurses and others carrying on these projects. In the Chicopee Nursery Schools the pediatrician of the Well Child Conference Unit of the Division examined the children for the detection of physical defects.

In the Cape Cod district the school physician included these children in the physical examinations of the school children, and in the town of Orange the children were given a complete physical examination.

2. School Hygiene:

(*a*) *Millville:*

The most interesting and outstanding project in school hygiene was that in connection with the Town of Millville. The Department of Public Health was asked by the State Commission governing the Town of Millville to take over the school health service for that community. Of particular value to the Department was the opportunity thus afforded for experiment and research. The problem for solution was: How much can be accomplished in a small town by a school health officer giving an average of approximately seven hours a week to such service. When this problem is finally worked out it will give a standard by which to measure work done by a health officer serving several towns.

A health examination was made of every school child, as required by law, the local school nurse assisting at these examinations and doing the weighing and measuring of the children. In all, 362 children were examined in the course of the year. A high percentage of children was found to have major defects, chiefly nutritional and dental. A comparison of defects found at the beginning and end of the year may be of interest:

	Jan. 1935	Jan. 1936
Percentage of children showing defects	91%	53%
Tooth defects	84%	25%
Nutrition defects	28%	17%
Throat defects	24%	17%
Posture defects	18%	4%
Nose defects	9%	8%

Present indications are that an unusually large number of children have had their defects corrected. Of the 124 children rechecked in the fall, 80 had had all defects corrected. Much of this was due to funds received from the Town of Wellesley and through the Community Council of the Town of Millville. For several years Wellesley cooperated by providing funds for dental service to the children in Millville.

Through private funds also a nutritionist was obtained for three months' work during the summer. The purpose of this was to stimulate interest of parents and children in such things as proper food, sufficient sleep, recreation, and the correction of defects which would be likely to affect the nutrition of children.

All children were given the audiometer test for hearing and those found to have defective hearing were later examined by an otologist.

Sanitation has been improved in one of the rural schools and further sanitary improvements are planned.

(*b*) *Health Awareness Test:*

A test of health awareness for high school students was developed with the superintendent of schools of Rockport. This has been tried in a number of communities and very favorable comments have been received concerning the test. Further work is planned for the use of such a test.

(*c*) *Health Education in Secondary Schools:*

Continued interest was shown in health education in secondary schools. The School Hygiene Consultant conducted a class for teachers and gave assistance to ten towns in the furtherance of the program of health education in the secondary schools. The Town of Dighton was given a week's demonstration in health work among this group, at the request of the school committee.

(*d*) *School Hygiene Surveys:*

Four school hygiene surveys were made during the year. In North Adams, Ashburnham and Winchendon a complete survey was made and in Lexington an intensive school lighting survey was made, at the request of the Superintendent of Schools.

(*e*) *"Contact":*

Several issues of this pamphlet were distributed during the year and this publication has met with favorable comment from school physicians and others, for whom it fills a need.

3. Public Health Nursing:

(*a*) *Tuberculosis Nursing:*

The Public Health Nursing Consultants of the Division spend a great deal of time in promoting the tuberculosis program throughout the State, in contacting local nurses and securing their interest in the follow-up of tuberculous persons within their communities, in efforts to locate contacts, and assisted in organizing tuberculosis nursing service and furthering adequate record-keeping.

The Nursing Consultant for the western district of the State arranged a field visit with three local nurses to Worcester County Sanatorium to observe the set-up of the chest clinic being conducted by the Sanatorium staff. She also attended eleven clinics for tuberculosis held in Northampton, Greenfield and North Adams.

The Nursing Consultant for the southeastern district in reviewing tuberculosis cases with local nurses found that excellent follow-up work had been done in several communities. In Fairhaven, where the Visiting Nurse Association had voluntarily done follow-up work on such cases, the town took financial responsibility for such service during the past year.

In Barnstable County special meetings were held in the interest of the tuberculosis nursing program and the Barnstable County Public Health Association took under consideration the matter of carrying the expense of tuberculosis nursing visits.

(*b*) *Communicable Disease Nursing:*

In all sections of the State the Nursing Consultants made efforts to secure continued immunization against diphtheria. This was carried out in two of the parochial schools in Swansea where a high percentage of the children were immunized.

On Martha's Vineyard, the State District Health Officer and the Consultant Nurse of this Division contacted the boards of health in Edgartown, Oak Bluffs, Vineyard Haven, West Tisbury, Chilmark and Gay Head relative to the towns assuming responsibility for the toxin-antitoxin program. This was accomplished, the local school physicians assuming the task of doing this work.

(*c*) *School Nursing:*

In Gosnold, on the Island of Cuttyhunk, while the Well Child Conference was in progress, all but two of the children resident on the Island were given physical examinations. These two children were off the Island that day, one a preschool child and the other a school child.

In a number of communities where new school nurses had been appointed the Nursing Consultants spent some time in field visits with the nurses, assisting in the school nursing and health programs of the towns.

In the school health program in the western section of the State the school nurses were urged to stress the necessity of adequate lighting facilities in the schools to prevent eyestrain, and advocated the use of the sightmeter to measure the lighting in the classrooms. Correct posture and proper shoes for children, helping to secure more adequate physical examinations of school children, and better nursing follow-up visits with reports of results obtained, were other phases of school hygiene which received particular attention from the Nursing Consultant. The local school nurses were advised also to concentrate on meeting teachers in group conferences rather than individually, for the discussion of school health matters.

At the request of the superintendent of schools a school nursing survey was made by the Nursing Consultant covering the town of North Adams. Similar surveys were made by the Nursing Consultant of the Worcester County District in the towns of Ashburnham and Winchendon.

(*d*) *Hospital Training Schools:*

Lecture courses on Public Health, for nurses in hospital training schools, were given by the Public Health Nursing Consultants in the following hospitals during the year: Chelsea Memorial Hospital; Josiah B. Thomas Hospital, Peabody; Lawrence Memorial Hospital, Medford; Clinton Hospital; State Hospitals at Westborough and Worcester; Worcester City Hospital, Worcester Memorial Hospital and St. Vincent's Hospital, all in the City of Worcester; Farren Hospital, Montague; Cooley Dickinson Hospital, Northampton; St. Elizabeth's Hospital, Boston; Massachusetts Memorial Hospital, Boston; and at Rutland State Sanatorium. Through these lecture courses a total of 591 student nurses were reached.

Late in the year this service was discontinued as it was agreed that the State Board of Registration in Nursing would urge all hospitals having training schools for nurses to include such public health lectures in their curriculum. In Northampton, Pittsfield, North Adams, Montague and Greenfield arrangements were made to have this taken over by the hospitals.

(*e*) *Home Hygiene Classes:*

In Templeton and Provincetown very successful Home Hygiene Classes were conducted among the high school girls, and in the Town of Ashby a course in Home Nursing and Child Care was given by the public health nurse.

(*f*) *Continuation Classes:*

In May, Helen Hackett, Consultant in Public Health Nursing, carried to completion the Continuation Classes on the subject of Mental Hygiene at Metropolitan State Hospital, Northampton State Hospital and Worcester State Hospital. These classes included an enrollment of 72 students. In connection with this course arrangements were made with the superintendents of the State Hospital Schools in Belchertown and Wrentham to have the students from the Worcester and Northampton classes visit these schools to observe the work being done there.

In the fall, classes on the subject of Sociological Approach to Public Health Nursing were begun in Lynn, Quincy, Worcester, Fitchburg and Holyoke, with a total enrollment of 154 students. In December, two visits were made by members of these classes to the American Sugar Refinery. They were conducted through the factory and the assistant superintendent described the hazards of industry, racial backgrounds and customs of employees. The industrial physician and the public health nurse outlined their program of industrial hygiene for employees.

(*g*) *Public Health Nursing Institutes:*

Previous mention has been made of the Maternity Institutes for all nurses in the State. These were planned to bring before the nurses the most up-to-date and approved ideas regarding maternal and child care. The Nursing Consultants of the Division made special effort to have as many local nurses as possible take advantage of this service and all employing agencies were contacted and urged to make arrangements to release their nurses so that they would be able to take advantage of the Institutes. Judging from the comments received following these Institutes they were of immense value and stimulation to the local nurses in every section of the State.

The Nursing Consultants attended various Institutes during the year on the subjects of Tuberculosis, Parent Education, Child Health and the School Lunch.

(*h*) *Scholarships for Nurses:*

Through the generosity of The Commonwealth Fund, Massachusetts was again awarded scholarships for nurses, at East Harlem Nursing and Health Service, New York. The nurses from Falmouth and Townsend, and the nurse covering the towns of Barnstable, Yarmouth and Dennis received these awards. Another was awarded the nurse in Provincetown but she was prevented from completing the course because of illness.

(*i*) *School Lunch Survey:*

The school nurse serving the high school in Lowell reported on the school lunch survey for that school, thus completing the project for Middlesex County.

A detailed report of the school lunch project will appear later under the heading of *Nutrition.*

(*j*) *Health Clubs:*

In response to the demand from health clubs for nurses and teachers continued assistance was given these organizations by the Consultants in Public Health Nursing in the planning of their monthly programs and in securing suitable speakers for their meetings. In several instances this activity included nurses employed in Emergency Relief Administration projects. For some of these groups field visits were planned to the State Hospitals at Westborough and Worcester, and the Massachusetts State School for Crippled Children at Canton.

In the western district of the State three Nurses' Clubs were actively interested in public health, holding regular meetings with a good attendance. In this district, early in the year, there was organized the Hampshire County Social Welfare Workers' Club, the Consultant Nurse for the district being elected president of the club.

Blackstone Valley Public Health Club held four meetings during the year, one meeting being devoted to topics of interest to nursing association board members.

Northern Worcester County Public Health Association continued its activities and interest throughout the year. Special speakers were secured on the subjects of Safety Education, Social Service and Child Guardianship and Public Welfare.

A newly formed health club was that for Southern Worcester County, called the Southern Worcester County Health Workers' Club. The Nursing Supervisor was active in assisting with the organization of this club, and secured a speaker for the first meeting.

In the southeastern district the South Shore Health Workers' Club held six meetings during the year, and the Bristol-Norfolk Public Health Workers' Club held eight meetings during the year. In all of these meetings the Nursing Consultant assisted with the program.

The Cape Cod Public Health Club held regular meetings during the year, the Nursing Consultant attending five of these. She also attended four meetings of the Barnstable County Health Council, assisting in organization and program planning.

The Nahedi Club, which includes health workers in the towns included in the Nashoba Health District, held several meetings at which the Nursing Consultant attended. At one of these meetings she outlined the highlights of the Maternity Institute held in New York.

(*k*) *General Nursing Service:*

In some of the districts interest was focused upon the formation of Parents' Conferences, to include the preschool children as well as infants, for the furtherance of parent education.

The usual consultant service was given to local organizations in the various communities by the Consultant Nurses serving the districts. Such groups as Parent-Teacher Associations, Mothers' Clubs, Boards of Directors of Visiting Nursing Associations, welfare organizations and school groups were thus served.

The Nursing Consultants were actively engaged in the programs and meetings of the various sections of the Massachusetts Organization for Public Health Nursing, as well as the annual meeting. Several assisted with a health pageant for the State Nurses' Association, and attended district meetings of this organization. They attended also meetings of the League of Nursing Education and regional conferences of the American Red Cross.

In Westwood the Nursing Consultant was instrumental in organizing community nursing service, giving assistance with policies, routines, standing orders and organization of a medical advisory committee.

The towns of Marshfield and Westport have taken over the nursing services formerly maintained by private organizations, and here again the Nursing Consultant gave assistance and advice regarding the nursing programs.

As in previous years, frequent talks were given to high school students on "Nursing as a Profession," stressing again the importance of the knowledge of certain required subjects for entrance to accredited training schools for nurses.

4. Nutrition:

(a) *Nutrition Advisory Committee:*

While no stated meetings of the Nutrition Advisory Committee were called during the year, the individual members of that Committee gave valuable assistance on occasions in the discussion of nutrition problems concerning the nutrition program of the State.

(b) *Changes in Nutrition Staff:*

In October Catherine Leamy returned with her master's degree from Chicago University, ready to put into practice her knowledge thus gained, especially with regard to budgeting.

Helen Inman Duff, who came as substitute nutritionist during Miss Leamy's leave of absence, had her time extended for the time necessary to complete the school lunch project. Coming directly from practical institution work, she ably assisted school lunch managers and school principals in rounding out nutrition service.

The other members of the nutrition staff gave varied assistance and practical help in nutrition to communities.

(c) *Community Nutritionist:*

A nutritionist for the large community and an itinerant nutritionist for the small community have come to be recognized as good public health expenditures by a few forward-looking communities in Massachusetts. Studies made by Forsyth Dental Infirmary in Boston and by the Association for Improving the Condition of the Poor, in New York, showed that families influenced by nutritionists improve their diet and health. The families in New York influenced by the nutritionist spend on an average seven cents less per adult male per day, which would represent a saving of seventy-three dollars per family per year, making the expenditure a practical one.

So that other communities might know of this pioneer worker, there was prepared the leaflet entitled "The Community Nutritionist." The Nutrition Advisory Committee to the Department, local nutritionists, leading nutritionists of the country—notably Miss Lucy Gillett of the Association for Improving the Condition of the Poor, and Miss Mary McCormick of the New York State Department of Education—physicians, nurses, and social workers contributed helpful ideas.

Feeling that a demonstration of a "community nutritionist" would be of value, the Southern Berkshire Health District was "endowed" with an itinerant nutritionist from the Department, and Pittsfield with another. These nutritionists assisted family physicians, dentists, dental hygienists, nurses, social workers, and teachers with the nutrition problems of families with whom they had to deal.

With this pioneer work in view, another of the Division of Child Hygiene nutritionists worked out a dental-nutrition plan for a community which may be useful not only to Reading and Provincetown, the towns in which this was carried on, but as a plan for community nutritionists to adopt. In this plan Miss Ruth White of Forsyth Dental Infirmary, Boston, assisted, as did the dental hygiene supervisor and the nutrition consultant of the Division of Child Hygiene. Miss White developed the plan for a dental infirmary and our nutritionist worked it out practically for a community, both from the corrective and preventive standpoints.

For the small schools, with untrained lunchroom managers, one of the nutritionists developed school lunch plans, not only for individual schools to which she gave service, but as a guide to the future community nutritionist.

Millville gave an opportunity to work with an able and enthusiastic nutritionist in a small town. Through funds from Wellesley College a nutritionist (Miss Hager) was employed on a three months' basis, to help remedy the findings of Dr. Moore of poor nutrition among the school children. As a result not only the children but their families began to spend their food money to better advantage and to improve their eating habits, and better nutrition was observed in the fall by the physician examining the children. In a three-months' program only a start can be made in changing life-long habits, so it is hoped that the nutritionist can be employed again the coming year.

The towns of Milton and Wellesley and the City of Springfield also conferred with the Department nutritionists on community nutritionist plans.

(*d*) *School Lunches:*

It was gratifying to have the continued assistance of leaders in the State Federation of Women's Clubs during the year in discovering the needs of school lunches for children and ways of bettering them. The Master of the State Grange (Mr. Brightman) appointed Mrs. Rowe of the Community Service to interest leaders in country towns to work on this problem. Mrs. Stritch and her six regional chairmen of the Works Progress Administration also attended the school lunch meeting called by the Commissioner of Public Health, and assured us of their cooperation. The State School Lunch Committee consists of members from the State Department of Education including Extension Service and the Department of Public Health; the Child Welfare Division of the State Federation of Women's Clubs; a chairman of the Home and Community Service of Pomona Grange; a representative of Works Progress Administration; and the Nutrition Consultant of the Department who acts as secretary. About 39 per cent of the cities and towns of the State were surveyed by local leaders from different organizations. It was felt by the State School Lunch Committee that these leaders living in the communities could best keep up the standards for the school lunch by actively supporting the local school authorities. Plans are being made for free school lunch projects under the Works Progress Administration. There are still many problems ahead.

A new educational feature was a week's conference for lunchroom managers, as the survey showed this need. This was undertaken jointly by the State Departments of Education and Public Health, and was held at the State Teachers College in Fitchburg. There were in attendance 26 lunchroom managers from 23 communities. Local school lunch managers made the conference practical by giving their plans that worked successfully and also by asking help on problems.

Institutes for school lunch managers were held in Boston, Springfield and Weymouth, at which the Director of the Division presided. The panel method of discussion was used at Boston and Springfield, the members of the panel for Boston being Dr. Blood of Simmons College, on the subject of Nutrition; Miss Katherine Baker of Medford, regarding the lunchroom in the city school; and Mrs. Ruth Underwood of Falmouth, representing the elementary and high school nutrition education. For Springfield the panel consisted of Dr. Helen Mitchell of Massachusetts State College, on Nutrition; Mrs. Ruth Underwood—the smaller school; and Miss Agnes H. Mansfield—the school lunchroom in Springfield.

In Weymouth a different method was used. The Superintendent of Schools and the lunchroom manager joined with this Department in giving the Institute. The Superintendent spoke of the growth of the Weymouth lunchroom over a period of fifteen years, and especially on the noiseproofing. The lunchroom manager showed her actual lunchroom plans and presented a copy of a week's menus to the guests. Dr. Mary DeGarmo Bryan from Columbia University, an authority on school lunches, stressed the need for lunchroom managers to have practical, scientific and business training, as well as efficient helpers for the job, which represents an expenditure of three hundred millions of dollars annually here in the United States. Round-table discussions brought out such points as "keeping out of the red," and interesting children in buying more of the protective foods. The Roundtable for the representatives of the large schools was led by Miss Skala of Weymouth and Miss Nicoll of this Department; the one for small schools was led by Miss Cobb of Weston and Mrs. Duff of this Department. The Deputy-Superintendent of Schools in Lynn considered this one of the most practical institutes he had ever attended. The success of the Institutes was due to the united efforts of the school and health departments. The attendance was as follows:

Boston	121	from	48	communities
Springfield	53	"	23	"
Weymouth	125	"	45	"
	299	"	116	"

An opportunity was afforded the Consultant in Nutrition, through the State Commissioner of Education (Dr. Payson Smith), to talk on school lunches at the School Committee meetings held at the State Teachers Colleges in Salem, Bridgewater, Westfield, North Adams and Worcester. The superintendents of schools and school committee members brought up the burning question of "keeping out of the red" in the administration of school lunches, but they also expressed real interest in the right kind of school noonday meals for the children.

As a follow-up of needs found in the survey and in school lunches the nutritionist concentrated on 29 towns, helping with nutrition education, planning better menus at low cost, better buying methods, organizing the school lunch where none existed, outlining better equipment for the preparation and serving of lunches, adequate bookkeeping methods, as well as assisting with surveys to find out the needs of the school lunch. The nutritionist assigned to special school lunch work attended 18 meetings in the interest of the school lunch and gave 23 talks on the subject.

(*e*) *Well Child Conferences:*

A statistical summary of the Well Child Conferences appears in detail in the general report of that activity. From the figures of all conferences held in 1935 it was found that the nutrition condition of the children seen was essentially the same as for 1934. However, more families were receiving welfare aid and were in need of budget advice, and more recommendations were necessary urging increased use of fruit, vegetables and whole grains.

In Williamsburg the three-year comparison shows a constant improvement in the nutrition condition of the children and in the number of specific recommendations made. In Northampton the nutrition picture was better in 1935 than in the two previous years, although there was an increase of 16 per cent of those needing budget advice over those in 1934, while fewer recommendations for specific foods were made.

Junior and senior students in Home Economics at Massachusetts State College observed at Northampton and Amherst Well Child Conferences, after a conference with our nutritionist.

(*f*) *Community Dental Nutrition Service:*

In Provincetown a dental nutrition plan was definitely set up to include both the clinic service and the nutrition home visit for children showing decided dental caries. The peculiar conditions in the town made the figures on the choice and preparation of food somewhat unique. Three fourths of the children visited had less than one pint of milk; one half of these had less than a cup a day in the winter. The winter home visit was followed in the early summer by a letter stressing the use of more raw fruits and vegetables at a time when they were more readily available. Results of the expected follow-up examination and home visits will tell the story more clearly.

The Reading dental-nutrition service merits special attention because of the fine cooperation and intense interest of the local dentists, and again because Reading is more typical of the average Massachusetts community. Over one third of the very detailed examinations were made by family dentists, and the child's full record is kept in the dentists' offices to be filled in as dental work is completed during the year. Reports of his cases were given to each dentist, as well as the nutrition recommendations made to the family. Several outstanding points in the study are of interest:

Mouth conditions:	All 104 cases had decided caries; one half had soft red gums instead of pink.
Economic conditions:	Almost one half of the families were in poor economic condition.
Eating habits:	Only one half had good eating habits.
Milk:	One third had less than 1 pint a day.
Vegetables:	Less than one half had a raw or cooked vegetable besides potato every day. One fourth never had raw vegetables during winter and spring.
Fruit:	Only one third had fruit daily. 17 had no fruit at all.
Dark Breads and Whole Grain Cereals:	More than one half had these regularly.
Sweets:	One half had more than enough candy.

This is convincing evidence that in homes on all economic levels we still have a great problem to teach families to eat a normal adequate diet. This service will be continued another year.

(*g*) *Parent Education:*

Through cooperation with department stores, this service was given chiefly in the city of Boston, in two of the larger stores. In one, during Parent Education Week, a marketing exhibit was set up as part of the large exhibit for that event, and nutrition leaflets of the State Department of Public Health were distributed in quantities. A twenty-minute talk on "Three Meals a Day" was a feature and was given to an audience of more than one hundred mothers, resulting in requests for five talks on the subject before mothers' groups later.

In another of the department stores a Family Information Center was established, the Department of Public Health being requested to participate as one of the cooperating agencies. Two exhibits were shown, one on "Good Food Habits for the Small Child"; the other on "Getting the Most for Your Food Money—and The Kitchen Convenient." Suggestions for other exhibits and sources of materials were given and many questions answered relating to good nutrition for the entire family.

Both of these efforts at parent education have been very stimulating and have opened up unusual opportunities for nutrition education with groups that we are especially anxious to reach. An outcome of one of these projects was the opening of a section for books on child care and family relationships in the lending library of one of the department stores.

In Boston, under the auspices of the Boston Tuberculosis Association, a course on Nutrition was given for colored mothers, a series of four lectures being included in this course.

Talks to parents' clubs were also given in 29 towns.

(*h*) *Nutrition Education for Professional Workers:*

Nutrition education was given nurses, home economics teachers, teachers, social workers, lunchroom managers, dietitians, physical educators, public health workers, and dental hygienists. The nurses in training schools were given talks at Worcester in the Memorial, State Hospital, City Hospital, St. Vincent's and Hahnemann Hospitals; at Westborough, Clinton, St. Elizabeth's in Brighton, and Rutland State Sanatorium. The nurses asked nutritionists to talk at meetings of Visiting Nursing Associations in Provincetown, Lowell, Reading and Pittsfield; at the meeting of Public Health Workers at Lynn, Northampton, Pittsfield and Great

Barrington. Some nurses attended the summer conferences at Fitchburg State Teachers College.

Talks were requested for home economics students at Framingham State Teachers College; the University Extension Class at Harvard University; Boston Teachers College; and Massachusetts State College. A week's conference at Fitchburg State Teachers College was given for home economics teachers.

Staff education assistance was given to student dietitians at Massachusetts General Hospital through an exhibit and talk. A talk was given at Sargent School; one for Boston University School of Education, and one for the students of the Harvard School of Public Health. Assistance was given also on special problem cases to individual workers.

(*i*) *Welfare:*

At the Massachusetts Conference of Social Work the Consultant in Nutrition represented the Department.

The Departments of Welfare in Pittsfield, Reading and Great Barrington, and the commissaries in Leominster and Fall River were contacted and aid given with regard to their food orders for families on relief. In the latter community the commissary was taken over by the Department of Public Welfare of the city.

"Your Guide," for use of families on low budgets, was revised as there was a great demand for it.

A study was made on how lowered health and welfare budgets have affected the family with tuberculosis in Massachusetts, for the use of the Commissioner at the meeting of the National Tuberculosis Association. Reports were received through local nurses, social workers, and the nutritionists of the Department. The indications were that borderline or new poor families were the ones who suffered, whereas the cases on welfare aid received more adequate aid than they did ten years ago.

(*j*) *Emergency Relief Administration:*

Works Progress Administration:

Adequate market orders at minimum cost, for different-sized families, were prepared and sent by the headquarters director for Emergency Relief Administration to the local officers for these projects. Returns giving local prices were received at the Department from 47 of them. It was of interest to note that food prices in the country towns did not vary much from those for the cities.

When Works Progress Administration was started, a conference was held with the State Director of Women's Work with regard to the employment and classification of the nutritionists. It was agreed that the nutritionist be classified as a professional worker as was done in Washington, instead of being classified as a skilled worker. The Department nutritionists were asked to follow up the Women's Work under these projects as was done under Emergency Relief Administration, and this cooperation was given.

An intensive three-day conference with Emergency Relief Administration nutritionists was held in Worcester; a school lunch feeding project in Springfield was visited, and assistance given also in Worcester County with regard to school lunch feeding projects where the need was evident from the surveys made. Assistance was given also for the nutrition project at Brockton. Work was done on menus and market orders for nursery schools; a visit was made to the Army Base and foodstuffs inspected and plans made for the distribution of surplus foods to be given to school lunches as a means of decreasing the cost per capita per child.

Help on food problems was given to transient shelters and camps in Charlestown, Wakefield and Lawrence.

At the four section group meetings for preschool center teachers a nutritionist assisted, and a group in Boston were helped with food budgets.

(*k*) *Scurvy Study:*

A study was made of scurvy cases seen in representative hospitals throughout the State—a comparison of pre-depression case incidence with that for 1935. The main impression seemed to be that there had been no increase in scurvy cases. In two instances more cases were reported—at the Children's Hospital, Boston, and by the Boston Community Health Association. This gives only a superficial picture for there is no way of knowing how many cases were seen by private physicians. It seemed, however, that there was little evidence to support the statement made that there had been an increase in scurvy.

(*l*) *Sanatoria:*

A forward step in the nutrition study at the State sanatoria for tuberculosis was the home visiting program of the nutritionists, planned with the social workers for the Division of Tuberculosis. Certain homes were selected by the social workers where a recent tuberculosis case study revealed that economic conditions were a serious problem for the family. After a study of the records and discussion with the social worker, the nutritionist visited the home to give whatever assistance was possible to the family. In most cases the families were receiving welfare aid, but they were anxious to receive suggestions for getting the most for their money. Of the 21 visits made only two were of questionable value, these because of faulty attitudes. These few visits have convinced us that the field for cooperation between the social worker and the nutritionist in preventing further sub-optimal health in the family, and in more adequately preparing the home to receive the sanatorium child, is an important matter.

(*m*) *Summer Camps:*

The health camp at Greenfield was visited and suggestions given on menus for campers, stressing the need for more fresh fruits and vegetables. In Fall River, at the request of the superintendent, special attention was given to menus, buying, preparation and serving of food, and a follow-up visit was made to the camp to observe the quality of foods served. The Consultant Nurse for the Northeastern District, with the nutritionist from the Chadwick Clinic, visited the health camps in Essex County, Malden, Salem, Lawrence Tuberculosis Camp, and Southern Middlesex Camp in Hudson.

5. Dental Hygiene:

(*a*) *Dental Certificate Program:*

The dental program started in 1927 with 78 cities and towns reporting having carried on the dental certificate program. This covered 535,551 elementary school children in the State, including grades one to eight. The total number of children then receiving certificates was 25,949 which represented 5 per cent of the total elementary school population.

There was an increase in the number of towns which reported having carried on the dental certificate program during 1935—290 as against 261 reporting for the previous year. The following table gives statistics concerning the children who received dental certificates:

	1928–29	1929–30	1930–31	1931–32	1932–33	1933–34	1934–35
Number of cities and towns reporting	126	178	226	243	299	261	290
Elementary school membership for Mass. (grs. 1–8)	533,545	529,764	530,818	525,853	542,108	518,227	462,934
Dental Certificates awarded by:							
School dentist	Not rep.	Not rep.	14,839	25,431	28,679	29,117	20,764
Clinic dentist	23,052	45,989	51,624	64,106	68,901	78,898	75,089
Family dentist	27,296	44,774	64,052	32,260	48,474	41,688	42,338
Total number of children receiving certificates	50,348	90,763	130,515	127,797	146,054	149,703	138,191
Percentage of elementary school population receiving certificates	9%	17%	25%	24%	27%	29%	30%

(*b*) *Dental Clinics:*

Complete annual reports of local dental clinics and traveling dental clinics were received from 149 towns, out of a possible 245. The following statistics of dental clinic service may be of interest:

	Local Clinics	Traveling Clinics
Children receiving dental care .	148,069	4,102
Children with work completed .	57,662	2,921
Cleanings done . . .	18,274	1,805
Fillings done	126,727	8,234
Teeth extracted . . .	97,767	3,454

The traveling clinic in Hampshire County served 24 towns; that in Franklin County served 9 towns; the clinic in Southern Berkshire District served 9 towns of those belonging to the Southern Berkshire Health District; the Worcester County Clinic served 8 towns in that county; two dentists conducted traveling dental clinics which served a total of 13 towns in 1935.

(*c*) *Preschool Program:*

Dental inspections were made at the State Demonstration Well Child Conferences held in 10 towns. There were 694 children thus inspected, of which number 324 were found to have no dental caries; 37 had fissures only, and 333 were found with dental caries.

(*d*) *"Protect Your Smile":*

The "Protect Your Smile" program, started in 1934, proved to be very successful and the Division participated in this activity on various occasions throughout 1935.

(*e*) *New Dental Service:*

From the suggestion made by the Consultant in Dental Hygiene while the Well Child Conference was in progress for the Island of Nantucket, dental service was established for the Island. The three local dentists agreed to examine the entire school population, including Siasconset, during the month of November. Following these examinations the children were classified into groups as follows: those who can go to the family dentist; those who can pay for part of the cost of dental care; and those who cannot pay for any such service. Seal sale funds were used for the correction of dental defects for those unable to pay, and funds from unofficial groups were contributed toward this expense also.

(*f*) *General:*

At the request of the Massachusetts Dental Society a special exhibit on dental hygiene was displayed at their annual meeting.

Another dental exhibit was prepared for the use of the 4-H Clubs in their program.

In Brockton the dental hygienists and dental assistants formed a club for the purpose of discussing dental hygiene, and the Consultant in Dental Hygiene of the Division assisted in the organization and program of this club.

6. Health Education:

(*a*) *Courses in "Charm":*

A four-lesson course in "Charm" for high school girls was given in sixteen high schools. From the towns of Athol, Bourne, Merrimac, Sandwich and South Hadley the request for this course came from the school officials. In Amesbury, Ashby, Ayer, Greenfield, Littleton, New Salem, Orange, Provincetown and Stow, the school nurses asked for this service, and in Amherst and Williamsburg impetus came through a 4-H Club Leader who is active in school affairs.

Settlement Houses became interested in such a course for older girls and courses were carried on in Cambridge Neighborhood House, East Boston Social Center, and are nearing completion in Norfolk House Center and North End Union in Boston. At the Boston Young Women's Christian Association the same material was presented to unemployed girls and a surprising amount of interest was displayed.

Single talks on "Charm" were given before six school groups, which included junior and senior high school pupils; also before the 4-H Club service groups in ten towns. Girl Scouts, Camp Fire Girls, Mother and Daughter groups, and other similar organization meetings were covered with such talks and the interest was most surprising.

(*b*) *Publicity:*

Activities in this field have been largely giving consultation service to local visiting nursing associations regarding annual reports, means of securing funds for the service, etc. Lectures on "Publicity" were given in the courses for student nurses in five hospitals, for the students in the Public Health Nursing Course at Simmons College, and for the health nurses of northern Essex County.

State-wide news releases were sent to newspapers on the Maternity Institutes, the School Lunch Institute, Causes of Infant Deaths, Play Day and Mothers' Day.

"Publicity Suggestions," for general publicity use, was the main publicity project during the year. In this way the most fundamental publicity topics were discussed and fully explained.

(*c*) *Play Day—Child Health Day:*

The special health education project during the year was that concerned with Play Day—Child Health Day, and these celebrations were planned in cooperation with the State Department of Education. Demonstrations of Play Day activities were given by the schools in Amherst and Concord, and by the Plymouth County 4-H Clubs.

(*d*) *Pamphlets, Posters, Exhibits, etc.:*

The pamphlet "Keeping Well" was completely revised, the New England Health Education Association cooperating in this work. The "Twenty-Four Hour Study of High School Activities," a questionnaire, was prepared during the year. "The Baby and You" was revised, as were also the prenatal and postnatal letters at various times during the year. Other pamphlet revisions were "Care of the Teeth," "Food for the School Child" and "Food for the Teens."

New reprints received during the year include the following:

A Survey of Artificial Pneumothorax in Representative American Tuberculosis Sanatoria, 1915–1930—Peters, Pope, Morriss, Packard and Miller
Rabies Control from the Standpoint of the Health Officer—Anderson
The Present Status of Scarlet Fever Prevention—Anderson
Scarlet Fever Immunization of Nurses—Anderson and Reinhardt
Symposium on the Control of Certain Communicable Diseases—Eley, Anderson, McDonald, Robinson and Smith
The Role of the Public Health Nurse in Communicable Disease Control—Anderson
The Prevention and Control of Syphilis—Nelson
The Clinical Diagnosis of Gonorrhea in the Adult Female—The Neisserian Medical Society of Massachusetts
Definition of Terms in Health Education—Committee Report of the Health Education Section of American Physical Education Association
Present Status of the Pneumonia Problem—Anderson and Heffron

Seven pamphlets were reprinted during the year with little change in their content. New Department publications printed during the year included the following: School Lunch Menus for Winter, Spring and Autumn; Healthful Living for the Teens; Maternal and Infant Mortality and Birthrate Charts; Tentative Outline for Consecutive Teaching during the Prenatal Period. The School Lunch Menus filled a great need and were much in demand for the use of school lunch managers.

In the spring dentists were contacted regarding the printed material available through the Department, and 251 orders were received for the pamphlets. A total of 58,926 pamphlets were distributed to this group.

From Brockton Fair 701 orders for pamphlets were received and from the Eastern States Exposition in Springfield a total of 672 orders were received. These included requests from other states to the number of 1,378 persons who attended the fairs, totalling 32,122 pamphlets.

Including the above there were received requests for printed material totalling 1,323,022 pieces. The distribution of this material was as follows:

	Pieces
Child Health Day material	12,048
Summer Round-Up material	112,802
Dental Hygiene material	186,975
Other publications	1,011,197
	1,323,022

Out-of-state requests came from the following states through the Brockton Fair and Eastern States Expositions: Maine, New Hampshire, Vermont, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, District of Columbia, Ohio, Oklahoma, California, and one request from Prince Edward Island, Canada, a total of 267 in all. Including these there were received from outside Massachusetts a total of 1,983 requests for Department pamphlets.

From other countries there were received 48 requests for pamphlets, as follows: Canada, Porto Rico, England, South Africa, Hawaii, Mexico, Italy, Brazil, Ceylon, Switzerland, Denmark, France, Wales, Sweden, Netherlands, Jugoslavia and India. Seven of these requests were from a group of experts of the League of Nations Interchange who visited the Department late in the year.

Four issues of *The Commonhealth* were printed during the year, the special topics covered being Cancer, Tuberculosis, Personal Hygiene and A Handbook for Physicians. All physicians of the State were sent copies of the Cancer and Tuberculosis issues, as well as the last number of *The Commonhealth* and there has been considerable demand for it from other sources.

The outstanding exhibit during the year was held at Brockton Fair and again at Eastern States Exposition, and included the general public health facilities and accomplishments in Massachusetts in 1934. Other health education exhibits were shown at Boston University, Sargent School; Boston Teachers College; Framingham Teachers College; Fitchburg Teachers College; New England Health Education Association; Harvard School of Public Health; Massachusetts Dental Society; and American Association of University Women.

Special nutrition exhibits were prepared for Preschool Centers and Nursery Schools under the Emergency Relief Administration at Salem, Worcester and Westfield Teachers Colleges, and at the Massachusetts School of Art in Boston. Another was sent to the State Federation of Women's Clubs for their annual meeting in Swampscott, and one to the American Home Section in Boston. School Lunch exhibits were prepared for use at the Teachers Colleges at Fitchburg, Worcester, Westfield, North Adams and Salem, as well as for the School Lunch Institutes held in Boston, Springfield and Weymouth.

In practically all of the talks and group meetings the nutritionists made use of exhibit material. Some exhibits were prepared by the nutritionists and some by the Works Progress Administration artists. During the year exhibits were prepared on food for the expectant mother, as a follow-up of the Maternity Institutes; on preschool children; school lunches, and foods at low cost. One of the nutritionists gave assistance not only with nutrition exhibit material but with exhibits for Eastern States Exposition, Brockton Fair, Federation of Women's Clubs, and for department stores.

In Pittsfield a special exhibit was prepared showing the activities of twenty-five social agencies in that city. The services of the Health Education Workers of the Department were loaned for consultation with local officials to aid in the general layout plan for the entire exhibit. Likewise for the Brockton and Springfield fairs a great deal of the time of this worker was spent in planning and preparing the display material.

In the school visitation carried on by the Health Education Supervisor of the Division a total of 56 parochial schools were visited for the first time in 1935, as against 22 in 1934. Public schools were revisited in nine cities as against three the previous year and fifteen parochial schools were revisited during the year.

(*e*) *Library:*

Several meetings of the Library Committee were held to pass upon requests for accessions to the main library and to the various Division libraries of the Department. For the use of the Department staff there were added to the Library during 1935 a total of 102 new books and magazine subscriptions, each catalogued when received. The cataloguing of books in the library was continued but there is still much to be done on it. Some work was done on classification and cataloguing of reprints, but here again the progress is slow because of limited personnel and overwhelming duties in other lines of work.

(*f*) *Lectures, Motion Pictures, etc.:*

There were given during the year 1,018 lectures and 121 radio broadcasts, this service being given in 168 communities of the State and 4 outside the State. Aside from radio listeners, 66,651 persons were reached through the lecture service afforded by the Department.

Motion picture films on health subjects were loaned to 100 communities and delineascope filmslides to 16 towns in the State.

Exhibits were displayed in 52 communities during the year. In many instances they were used as a part of the demonstration Well Child Conferences; in some towns local organizations made use of them for special projects, and at other times staff members used the exhibits in connection with special meetings or demonstrations.

(*g*) *Prenatal and Postnatal Letters and Fathers' Letter:*

At the close of the year there were on the registry for the monthly letter service to prospective mothers and to mothers of children under two years of age approximately 26,140 names. The new requests for prenatal letters during the year totalled over 8,040 names, as against a total of 7,654 the previous year; for the first year postnatal letters, 7,423 as compared with 7,157 in 1934, both series of names being carried over to receive the second year postnatal letters later. The fathers' letter was sent to 8,040 fathers during the year.

(*h*) *Cooperation with Outside Agencies:*

The Director of the Division served on the Committee of the State Department of Education, on a Course of Study in Health Education for Secondary Schools; as a member of the Massachusetts Child Council; also on the Committee for the Prevention of Juvenile Delinquency for the Boston Council of the National Civic Federation.

The Public Health Nursing Consultant for the western district organized the Hampshire County Social Welfare Workers' Club, of which she was elected president. She served also as chairman of the program committee of District 1 of the State Nurses' Association and is, as well, a member of the Board of Directors. Others of the Nursing Consultants served on committees of the Massachusetts Organization for Public Health Nursing.

One Nursing Consultant organized a course in Social Service to be given at Regis College, securing suitable speakers and selecting pertinent reading matter for the students. This same Consultant collaborated with the Metropolitan State Hospital in arranging an eighteen-hour course in Psychiatric Social Work for senior students, acting as leader for this course. In connection with this latter course a field trip was planned to Waverley Hospital to study mentally retarded children.

The Chief Consultant in Public Health Nursing, appointed early in the year, spent considerable time in cooperating with the Massachusetts Organization for Public Health Nursing in plans for five regional meetings, and participated in the program, the subject of which was "A Prenatal Home Visit." She held many conferences with State Relief Administrators in an effort to secure the appointment of a qualified nurse supervisor to pass upon all projects for nurses on relief. She cooperated with the public health nurses assigned to the Blackstone Valley Project Survey in their plans. Conferences were held with the Director of Public Health Nursing of the American Red Cross relative to the use of Red Cross funds for nursing services in district health units. Likewise conferences were held with the Consultant in Public Health Nursing for the United States Public Health Service, Washington, D. C., relative to official public health nursing programs. The Chief Consultant in Public Health Nursing also attended a two-day conference in Milwaukee, called by the United States Public Health Service, for all

State supervisory nurses and directors of public health nursing courses. Of the thirty-two states having such supervisors of nursing service, twenty-one were represented at this conference. The discussion included plans and preparation for future developments in public health nursing, with particular reference to its effect by the acceptance of the Social Security Act.

The Consultant in Nutrition cooperated with the State Department of Education through talks on school lunches, given at school committee meetings held at the State Teachers Colleges in Salem, Bridgewater, Westfield, North Adams and Worcester. Real interest was expressed in securing the right kind of lunch for school children. She also cooperated with the State Federation of Women's Clubs by preparing short items on nutrition subjects for their publication, Federation Topics, and conferred with them at their monthly meetings. Special assistance was given to the directors of Emergency Relief Administration and Works Progress Administration, with regard to food prices, adequate market orders, and other nutrition matters.

The Nutrition Consultant served on a committee with Miss Dimond of Boston Community Health Association, Mrs. Burke of the staff of the Harvard School of Public Health, connected with the Growth and Development Study, and Miss White of Forsyth Dental Infirmary, whose aim was to outline nutrition objectives for the National Organization for Public Health Nursing. Similar service was given also to the Massachusetts Home Economics Association and the New England Home Economics Association.

The nutrition staff of the Division assisted public welfare departments in various communities with their food problems, and visited commissaries in several places to give advice and assistance, as desired.

One of the Division physicians cooperated with the American Association of School Physicians in a study of the educational background of school medical officers.

Several members of the staff were appointed to serve on the various committees and sub-committees of the Massachusetts Health Commission.

(*i*) *Staff Education:*

All of the Public Health Nursing Consultants attended the two-day Maternity Institutes given under the auspices of The Commonwealth Fund and the Department, and all participated in the program of the Massachusetts Organization for Public Health Nursing.

Three of the Nursing Consultants attended the Maternity Institute held at the New York Hospital, and one of these took a special course in connection with the Continuation Classes on the subject of the Sociological Approach to Public Health Nursing, which she later taught to the nurses in Massachusetts who enrolled for these classes.

One of the Public Health Nursing Consultants attended the School Nursing course given at Simmons College during the summer.

During the year the Public Health Nutrition Worker who had been granted leave of absence for study, completed a year of study at the University of Chicago, and secured the degree of Master of Science.

The nutrition staff attended seminars of the Social Workers' Section of the New England Home Economics Association at various times throughout the year.

Several members of the staff attended the Social Workers' Conference held at Wellesley College, and the Tuberculosis Institutes in Boston and Springfield; also the conferences of the Child Study Association of America.

II. SPECIAL PROJECTS

Federal Emergency Relief Administration

Works Progress Administration:

(*1*) *Emergency Relief Administration Nursing Services.*

Nursing projects were approved for a number of the local communities under the Emergency Relief Administration. Advisory assistance was requested of this Division and the Public Health Nursing Consultants contacted the nurses thus employed, giving advice and assistance in the conduct of the service, record-keeping, etc. In some instances the nurses were employed for nursing service to persons receiving welfare aid and in others for school lunch projects, and for nursing service at the Nursery Schools under the supervision of the Emergency Relief Administration. In Waltham the Emergency Relief Administration project was a Summer Round-Up of children about to enter school for the first time.

(2) *Works Progress Administration:*

The Consultant in Nutrition and members of the nutrition staff consulted with those in charge of nutrition projects, visiting transient camps and shelters, and offering assistance and advice as required. A more detailed report of such activities appears in the report of the nutrition section of this report.

III. Personnel of the Division

We record, with pleasure, the appointment of Helen Chesley Peck as Epidemiologist in the Division of Child Hygiene, early in the year. She serves also as chief consultant in public health nursing for the Department. Miss Peck was at one time associated with the State Department of Labor and Industries and was engaged in the nursing field in Danvers in the past.

Miss Catherine Leamy, Public Health Nutrition Worker, returned after a year's leave of absence for study, and Helen Inman Duff, who substituted in her absence, was retained to complete the school lunch project on which she was engaged.

Late in the year Miss Florence Mahoney was transferred to the City of Boston service and Miss Helen Neville was appointed to the vacancy in the position of junior clerk and stenographer. Another change in the clerical staff was due to the transfer of Thomas Connaughton to the City of Boston service. John McLaughlin was promoted to that position as junior clerk and the vacancy in the position of junior messenger was filled by the appointment of W. Harold Gill.

Massachusetts Statistics for 1935

Population (Estimated as of July 1, 1935)	4,361,570
Death rate per 1,000 population (residents of Mass.)	11.4
Death rate per 1,000 population (non-residents of Mass.)	11.6
Infant mortality (per 1,000 live births)	47.8

REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

Gaylord W. Anderson, M.D., *Director*
N. A. Nelson, M.D., *Assistant Director*
John J. Poutas, M.D., *Assistant Director*

General Statement

The problem of communicable disease control for the year 1935 has been marked by two epidemics of some size, namely, German measles and infantile paralysis, in control of which a health department is today somewhat helpless. For those diseases for which specific measures may be taken, however, the year has been marked by very striking improvements, with a decline of diphtheria, typhoid fever, pulmonary tuberculosis and extrapulmonary tuberculosis to levels never previously attained. At the same time the deaths from whooping cough and scarlet fever have been at a lower level than ever previously recorded. The number of cases of communicable disease reported for the year was 110,397 as contrasted with 113,559 last year.

Prevalence of Special Diseases

Anterior Poliomyelitis.—The reported incidence of anterior poliomyelitis reached the third highest figure in the history of the State, 1,390 cases being reported as compared with 1,428 for 1931 and 1,927 for 1916. The figures give, however, a false impression as to the actual prevalence of the disease owing to the fact that in recent years many cases have been reported that would not have been included in the figures in earlier years. Thus in 1916 practically all of the cases that were reported were paralyzed, the cases that did not at any stage of the disease develop paralysis not being recognized as a mild form of the same disease. With the progress in medical knowledge from year to year, and especially because of the intensive work of the Harvard Infantile Paralysis Commission, which served to educate the Massachusetts physicians as to the diagnosis of non-paralytic poliomyelitis, a very substantial number of the cases reported today are of this type. Their inclusion in the total figures gives, however, a false picture as to the current outbreak when compared with other years. Thus, during 1935 in some parts of the State as many as three fourths of all of the cases reported were non-paralytic in type. Similarly, it is not possible to make a direct comparison between the Massachusetts outbreak and that in other states as the proportion of the reported cases that were paralyzed varied tremendously from state to state, due in all probability to variations in the degree to which the non-paralytic cases were recognized. This situation called for a change in the method of reporting. Provision for this has been made by the Public Health Council in declaring, under the authority to declare those diseases which shall be deemed to be dangerous to the public health, that paralytic and non-paralytic poliomyelitis shall be reported separately. This change will take effect on January 1st, 1936, and it is the plan of the Department that in the future all non-paralytic cases will be followed up with the local board of health to obtain a supplemental report if paralysis develops, necessitating a change in the classification.

The epidemic of 1935 was felt throughout the most of the eastern part of the United States. The first cases developed in North Carolina, spreading northward and westward. It is unlikely, however, that the cases in Massachusetts were any part of this epidemic but rather that they were part of an independent focus that embraced New York City and New England. Throughout New England, and especially in Massachusetts, the cases were confined very largely to the communities bordering or near the coast. In Massachusetts there was one large focus involving the Metropolitan Area, beginning in Boston, spreading first into the north Metropolitan and later into south and west Metropolitan sections. The North Shore was affected simultaneously with the Metropolitan Area, though the incidence did not reach the same levels. In the southeastern corner of the State, Fall River, with 114 cases reported, had the highest incidence of any single Massachusetts community. A number of cases occurred in adjoining towns. Other parts of the southeastern area and parts of the Blackstone Valley were invaded, apparently in large part as an extension out of Rhode Island. In the Merrimack Valley there was an independent focus involving particularly the cities of Lowell and Haverhill. The western part of the State was unusually free of the disease, except for a small focus in Springfield in September and October, these cases being more likely an extension upward along the Connecticut Valley than from the focus in the eastern part of the State. On the whole, however, the incidence of the disease in the western half of Massachusetts was not beyond average figures.

The Department has continued during the year to furnish convalescent serum and to make diagnostic consultation service available for suspected preparalytic cases. Clinics for collection of blood for the preparation of convalescent serum were held in conjunction with the boards of health of Beverly, Boston, Brockton, Cambridge, Fall River, Fitchburg, Framingham, Haverhill, Lowell, Lynn, Malden, Newburyport, Quincy, Waltham and Watertown as well as the Children's Hospital and the Community Health Association in Boston. There were 269 persons who came to these clinics from 235 of whom blood was obtained. Through the assistance of these boards of health and these donors, convalescent serum in adequate quantities was at all times available. In making this serum available, however, the Department attempted to stress the fact that it did not feel that the serum had necessarily any therapeutic value, but that it was furnishing the serum merely because there were so many of the physicians and public who had confidence in such a treatment in a disease for which no other specific treatment was available. Consultants of the Department saw 143 cases in consultation with 134 physicians, 87 of these cases being actually poliomyelitis.

Diphtheria.—The past year has witnessed a continued decline in the incidence of diphtheria, reaching the level of only 390 cases as compared with 629 for 1934. The decline in deaths has been even more striking with only 26 deaths as compared with 50 last year. These figures may well be compared with those for 1923, the year immunization programs began, when there were 9,018 cases and 579 deaths from this disease. During four of the months of the year there were no deaths whatsoever from this disease, this being the first year that the State has ever had a month free of diphtheria deaths. These figures for 1935 permit Massachusetts to claim one of the lowest diphtheria rates in the country in contradistinction to the position which was occupied some ten to fifteen years ago, when the rate was among the highest. Even more encouraging than the actual decline has been the evidence that even lower levels may be attained so that we can confidently look forward in future years to a far smaller toll from diphtheria than that which we have today.

This decline in the incidence of diphtheria has been experienced fairly uniformly throughout the State, though there are are still some communities in which it continues as a major problem. In 1933 and 1934, Lowell experienced the highest diphtheria death rate of any large city in the United States. Nineteen thirty-five has seen a reduction below the 1934 level, but still the city has the unenviable distinction of the highest diphtheria rate in Massachusetts, accounting for over 10 per cent of the diphtheria though having barely 2 per cent of the population. The program of immunization that has been carried on has left much to be desired. The end of the year has seen a sharp increase in the diphtheria in Chicopee, a city which through active immunization work had had a very low incidence of the disease for several years. Two years in which the work had been pushed less actively brought about a rapid increase in the non-immunized population with an attendant outbreak of 32 cases at the end of the year. In all other communities of any size there has been an actual decrease in the incidence of this disease.

This decline can be attributed in large part to the immunization work carried on by the boards of health or the school committees. During the past year clinics were held in 258 of the 355 communities in the State. Whereas a year ago there were 14 communities in the State that had never provided for immunization, there are as the year closes only 3 where the Boards of Health have been completely negligent in this matter; namely, Millville, Princeton and Savoy. Fortunately all of these are small communities, though this would not prevent a high attack rate among these children when and if the disease should be introduced, as has occurred in other equally small towns. In addition to this group of towns that have been negligent there are several which, though they have carried on some work at some time in the past, have permitted it to lapse with the result that a large unimmunized child population has grown up. Particularly significant in this group is the town of Franklin, where there has been no immunization work since 1930. These communities which permit the work to lapse present a more serious problem than do the occasional towns that have never undertaken it. In an effort to maintain this work from year to year until such time as immunization is so extensively practiced by the physicians that there will be no further need for clinics, the Department has urged all boards of health to obtain a specific appropriation for the conduct of diphtheria immunization work.

Great as may be our satisfaction in the decline in diphtheria, it should not blind us to the fact that there is still a large unimmunized population, and especially the fact that much of the immunization being carried on today is still in the school rather than the preschool group. It is self-evident that immunization should be carried on as early in life as possible so as to protect the child not only during its school existence but during the critical preschool years, when diphtheria exacts its heaviest toll of life. Unquestionably the last few years have seen an increased proportion of the preschool children immunized, but we are still far from our goal. The figures for the public clinics in 1935 are not as yet available, but those for 1934 show that less than 30 per cent of the children immunized in public clinics in that year were under the age of five. In that same year, with over 63,000 children at public clinics, only 2,216 children under the age of one and only 3,815 children one year of age were reached. Unless it can be shown that a very large number of infants were immunized by their family physicians we can draw no other conclusion than that we have still fallen far short of reaching through immunization a substantial fraction of children during the early years of life. Unfortunately, exact figures as to the extent of immunization in private practice are not available, but there is reason for believing that this number, while increasing from year to year, is still too small to bulk large in the total child population. This means simply that health departments, if they are to make further strides in the control of diphtheria, must place further emphasis upon reaching the preschool children.

The immunization work being carried on in the State has relied upon the use of toxin-antitoxin or toxoid solutions, with growing emphasis on the latter. One or two communities have experimented with the alum precipitated toxoid, which has found such a vogue in other parts of the country. It has seemed to the Department, however, that until further data are available as to the permanence of the immunity from a single injection of the alum precipitated toxoid and until the undesirable reactions occasionally encountered with it can be eliminated, it is the part of wisdom to limit its activities to the established and proven immunizing agents. It has also seemed the part of wisdom to maintain a conservative attitude with respect to the dosage of these, lest in our enthusiasm to simplify the administrative problem through reducing the number of injections we sacrifice too much of the protection obtained from them, as has been the case in some communities in other states.

During the year the Department has revised its popular pamphlet regarding diphtheria immunization and has at the same time continued the distribution of cards used by local boards of health to promote immunization during the first year of life. There is still, however, a need for the development of more effective means of reaching many of the children now unprotected, and in this we must probably look more and more in the future to a personal contact rather than through the impersonal medium of mere pamphlets.

Encephalitis Lethargica.—This disease reached during the past year the lowest recorded incidence in the history of the State, with only 16 cases as compared with a previous minimum of 22 in 1932. These figures are, however, not to be interpreted as an exact measure of the incidence of such infections, as there is in so many cases reasonable doubt as to the accuracy of the diagnosis, and furthermore, there is much reason for doubting the adequacy of the reporting. The figures are significant, however, as compared with previous years in indicating the lack of any evidence of increase in such infections, and particularly in showing that there is no evidence of beginning localized outbreaks such as occurred in St. Louis in 1933. Other parts of the country have experienced such localizations, though not to as large a degree as in St. Louis. So far, at least, Massachusetts has been completely free of such cases.

Epidemic Cerebrospinal Meningitis.—The past few years have seen this disease at the lowest level since the disease was made reportable. Nineteen thirty-three marked the low point, with some increase in 1934 and an even further increase in 1935, 83 cases being reported. There is probably no cause for alarm in this increase as the history of the disease shows that it occurs in cycles, lasting two or three years, with several year intervals between the cycles. The experience of the country as a whole, except for certain individual communities, has been comparable, 1935 showing a similar increase over the low figures of 1933 and 1934. There has been no evidence of any particular localization of the disease and therefore no reason at present to be apprehensive as to outbreaks such as affected Detroit in 1929 and 1930. With our lack of ability to control such infections it will, however, be but a matter of time before some Massachusetts community falls the victim of such an outbreak.

The work of Dr. Fothergill at the Children's Hospital in Boston in the diagnosis and treatment of Pfeiffer bacillus meningitis raises the suspicion that a certain proportion of the cases reported as epidemic cerebrospinal meningitis are due not to the meningococcus but rather to the Pfeiffer bacillus. Such evidence explains, apparently, some of the instances in which the patient fails to respond to the antimeningococcus serum. The extent to which the Pfeiffer bacillus may be confused with meningococcus infections, and its distribution throughout the State is at present unknown. For this reason the Department began toward the end of the year to make a deliberate effort to obtain so far as possible spinal fluid from reported cases of epidemic cerebrospinal meningitis so that these fluids might be examined for the possible detection of unrecognized Pfeiffer bacillus infections.

Gastro-Enteritis.—On numerous occasions during the year the Department has been called upon to investigate cases of gastro-intestinal disturbances, presumably due to food. In some instances these cases were unquestionably due to food infection, but in many others the evidence very strongly pointed against a possible common article of food. As more and more of these cases are being investigated the evidence becomes increasingly strong that, as mentioned in last year's report, there may be a form of gastro-enteritis which is probably spread through the upper respiratory tract. This type has been seen on several occasions within schools and colleges as well as within certain communities. There is great need for more intensive epidemiological as well as bacteriological studies of these outbreaks.

There is increasing attention being given in the literature to outbreaks of food-poisoning in which the vehicle for the spread of the infection was pastry with a custard filling. In many instances it has been shown that an hemolytic staphylococcus capable of producing a heat stable toxin was the etiologic agent. During February of this year an outbreak of such a nature occurred in the western part of the State, due unquestionably to eclairs sold by the trucks of a Connecticut Valley bakery. The cases were scattered through the Berkshires and even into the eastern end of New York. From many of these eclairs hemolytic staphylococci were isolated both by the State Laboratory and the Pittsfield laboratory. Attempts to identify these organisms through feeding filtered broth cultures to monkeys were unsuccessful in showing the existence of a soluble toxin. We were thus faced with the fact that an hemolytic staphylococcus had been isolated from these but there was no evidence that this particular strain produced toxins capable of causing illness. The situation was further complicated by the isolation of an apparently identical strain from bakery products of the same company which were sold without apparent illness. The problem of preventing recurrences of such outbreaks is at present very confusing. Even though we know that certain strains of such hemolytic streptococci can be the cause of such outbreaks, we do not know what is the source of these organisms and in what manner they are introduced into the food. Certain health departments in other states have made drastic regulations regarding the sale of such products, all of which regulations are based, however, on purely empiric grounds and are based more upon a pious hope than on scientific evidence that they will be successful. The only completely successful type of such regulation is that which has been attempted in some places forbidding the sale of such articles, but the public's taste for eclairs and other custard filled pastry is such that these regulations will never be accorded any real public support.

"Influenza."—The year has been remarkable by a freedom from influenza scares.

The Department has continued its plan of morbidity reporting from schools, industries and visiting nurse associations as a check upon abnormal incidence of respiratory infections during the winter months but has not found during the year any such occurrence.

Malaria.—Seventeen cases were reported during the year, all of which unquestionably contracted their infection outside of Massachusetts.

Measles.—The recorded incidence of this disease during 1935 was lower than in any previous year except 1919, while the deaths were at the second lowest figure on record, that for 1933 only being lower. Unfortunately, there was some increase in the case fatality rate, due probably to the fact that what measles occurred was concentrated very largely in several of the industrial communities where because of economic conditions the case fatality rate is normally higher than in other sections. Even though the year has seen a slight increase in the case fatality rate, the death toll from measles was still very strikingly below the figures that were characteristic of this disease ten or more years ago. Thus, during the five-year period 1921–1925, inclusive, the average number of measles deaths per year was 244, whereas during the past five years the average number has been but 57, in spite of the fact that the disease has during this period been equally prevalent. How much of this decline can be attributed to an uncontrolled change in the virulence of the virus and how much can be attributed to community efforts to reduce the mortality, largely through public health nursing programs, may be debatable. It seems inescapable, however, that the nursing program has contributed materially in this reduction, especially when a similar decline is noted in whooping cough, in which as in measles there had been until ten years ago no appreciable decline in the number of deaths for a period of at least twenty-five or more years.

The use of the placental extract, which is now being manufactured by the Department on a cooperative study with Dr. C. F. McKhann at the Children's Hospital has been further developed during the year with very encouraging results. The results available at the present time indicate that it is going to be possible to utilize this material to reduce the incidence of complications and therefore deaths among children known to have been recently exposed to the disease, and particularly those age groups where the risk of measles is greatest.

Pneumonia, Lobar.—The reported incidence of lobar pneumonia for the past year has been the highest since 1929. At the same time there has been a slight increase in the death rate, though still materially below that of any other year except 1932 and 1934. This slight increase does not, however, indicate that there is any permanent interruption in the rather steady downward trend in the toll from this disease. Reference to this has been made in previous reports.

Rabies.—During the first part of the year the incidence of rabies was increasing rapidly and was materially greater than at any time since 1931. These cases were occurring largely in Middlesex County, the Metropolitan district and the south side of the Metropolitan Area. In conjunction with the Division of Livestock Disease Control in the Department of Agriculture, an intensive effort was made by boards of health to conduct clinics to inoculate dogs against rabies. Such clinics were held in the following communities:

Acton
Arlington
Ayer
Belmont
Billerica
Bolton
Brockton
Brookline
Cambridge
Carlisle
Chelmsford
Clinton
Concord
Dracut
Dunstable
East Bridgewater
Everett
Framingham
Groton
Hanover
Hingham
Hopkinton
Lexington
Lincoln
Littleton
Lowell
Lynn
Marlborough
Marshfield
Maynard
Middleton
Milton
Natick
Needham
Newton
Norwell
Norwood
Pepperell
Reading
Rockland
Russell
Saugus
Sharon
Shirley
Somerville
Stoneham
Stoughton
Swampscott
Tyngsborough
Wakefield
Waltham
Watertown
Webster
Wellesley
West Bridgewater
Westford
Weston
Whitman
Winchendon
Winchester
Winthrop
Woburn

These communities are almost entirely confined to the sections of the State involved. Although there were many communities in these sections that did not conduct clinics, the response was such that within a period of four months rabies had fallen from the highest to the lowest level since 1931. The Department is gathering as extensive data as possible regarding the value of rabies control through this method. Although the data available are very incomplete, it is evident that the method while not successful in every instance, confers a sufficiently high protection upon most of the dogs so treated that it does very definitely limit the spread of the disease and may even stop an outbreak in a community. As such it is unquestionably worthy of more extensive use than at present.

Two human cases of rabies occurred. One of these was a Cambridge boy who refused antirabic treatment after being bitten on the hand by a stray dog. The other was a boy in Woburn who was bitten by a stray dog and developed rabies in spite of antirabic treatment. This is the first case in the record of the Department in which there has been a failure of treatment, except in those instances where the bite has been on the face or treatment has been delayed too long.

Scarlet Fever.—With only 8,304 cases reported, scarlet fever reached a lower level than in 1934, and the lowest level since 1922. During the latter part of the year, however, the monthly figures for the current year exceeded those of a year ago, indicating that the disease has once more started upward on its periodic swings. The next two or three years will therefore see a markedly increased incidence of this disease. Coincidental with the low incidence of the disease was a low death rate, only 57 deaths occurring, which is the lowest in the history of the State.

The studies carried on in other parts of the country, and notably in Detroit, have shown that it is possible to reduce the conventional four-week isolation period from scarlet fever to a shorter period without increasing the risk of spreading the disease upon release of the patient from isolation. These studies have shown also that there is a definite seasonal relationship as well as a variation with age in the risk of such secondary infections. It has not seemed feasible at present to set up an isolation policy conditioned upon age and season, but it has seemed desirable that in those cases which are not complicated the isolation period should be shortened to three weeks. The Department has formally made such a recommendation to boards of health, many of which have already adopted this shortened period. This should mean a greatly reduced hospitalization bill without at the same time increasing the risk to the community.

The studies of scarlet fever immunization through the use of toxin treated with formalin that were begun in 1931 have been continued. This immunization is now a routine procedure in the Department's hospitals for children and in the schools for the feeble-minded under the Department of Mental Diseases, experience showing that since this has been instituted scarlet fever has disappeared. This immunization procedure has also been made available in ten other institutions receiving children. This has been extended likewise to include four nurses' training schools. Community programs have been carried on in Bridgewater, East Bridgewater, Framingham, Gloucester, Greenfield, Holliston, Rockport, Shirley, Wellesley, the Southern Berkshire Area and the parochial school system in the city of Worcester. A total of approximately 15,000 children have been Dick tested, and the immunizing agent administered to approximately 7,000. As the work is still continuing as a study, it is as yet too early to formulate a definite report on the effectiveness of this so-called toxoid immunization. There can be no question, however, as to the innocuousness of the procedure and the data that are now available indicate very strongly that it has a real protective value, even though, as with other immunizing agents, cases of the disease may from time to time appear among the immunized group. It is hoped that within a year or more it may be possible to make a preliminary formal report on these studies.

Septic Sore Throat.—One hundred ninety-five sporadic cases of this disease were reported during the current year. There was no reason to believe that any of these were, however, spread by infected milk.

Smallpox.—For almost four years the State has now been free of smallpox, the last cases in Massachusetts having occurred in connection with the Fitchburg outbreak in January and February of 1932. As usual, those opposing vaccination made an effort to rectify this situation by seeking legislation to rescind the compulsory vaccination law, an action which in other states has been followed by an increase in the disease. Fortunately, the request for such legislation was as usual turned down by the Legislature.

Tuberculosis.—The reported incidence of pulmonary tuberculosis was about equal with that of a year ago, though the deaths showed a distinct decline. This decline of the deaths without a coincidental decline in cases probably represents merely a better finding and reporting of cases. Coincidentally, there was a slight decline in the number of extrapulmonary cases reported but a very striking decline in the number of deaths, which fell from 214 to 148.

Typhoid Fever.—The past year has seen a continuation of the decline in typhoid fever, only 112 cases being reported as compared with 135 a year ago. The decline in the sporadic cases was even more striking inasmuch as the current figure includes one outbreak of twelve cases, whereas in 1934 the largest single outbreak was but four cases. The number of deaths from the disease declined to but ten. When the deaths fell from 22 in 1933 to but 13 in 1934 there was speculation as to whether or not such a drop could be maintained. That the figures have been lower for the past year indicates, however, that this has been a very real, and more or less permanent drop. The end is certainly not yet in sight, for we have every reason to believe that the number of cases and deaths will decline even further so that ultimately typhoid fever will be as rare a condition as is smallpox today. It has already fallen to so low a level that variations from year to year other than as they are a part of the continued decline are hardly significant.

Of the 112 cases that occurred, the source of infection was found in 25 instances. Of these, 7 and possibly others were apparently due to an industrial water supply polluted through a cross-connection, 13 were due to contact with a carrier, and 5 were due to infection from a previous case in the same family. In the remainder it was not possible to prove the probable source of the infection.

The only outbreak of any magnitude occurred in Worcester, where there were several cases caused in all probability through a water supply polluted from an industrial cross-connection. The epidemiological evidence was conclusive in pointing to such a source, the only evidence that was lacking being the actual demonstration that the cross-connection in question had been leaking. Such connections have since been removed, thus obviating any further possibility of trouble from this source. The only other outbreak involving multiple cases occurred in Westport, where there were four cases in one family, three of which were, however, apparently secondary to an unrecognized initial case in the family. In Swampscott four cases developed in a group of persons associated about a summer home, the sources of these cases being undetermined.

Investigation of cases brought to light twelve typhoid carriers. As will be seen from the accompanying table, this is a higher carrier discovery rate than for 1934. In addition, three other carriers were added to the list as a result of the examination of stool specimens during convalescence. Four carriers underwent gallbladder removal in the hopes of curing the carrier condition, two of these being patients at the Taunton State Hospital and the other two in the civil population. In all four instances stones were found at operation. The total number of carriers who have undergone gallbladder removal now reaches twenty-nine. Of these, fifteen have been formally removed from the carrier list, three others submitted all of the necessary specimens other than the second bile sample, and the remainder have either lost interest in being removed from the list or have not yet had time to submit the required number of samples. Three carriers were removed from the carrier list this year following the submission of the conventional series of specimens following operation. The year ends with one hundred eight names on the active carrier list.

The high carrier discovery rate of the recent years has been due in large part to the practice of routinely culturing all members of a household where a case of typhoid occurs. This practice has not only brought to light a large number of otherwise unsuspected carriers, but has also resulted in bringing to light certain carriers who should have been found in previous years had such a procedure been routine practice. There are still health departments today, however, where cultures are obtained from only those persons giving a history of previous typhoid or those who are especially suspected by epidemiological findings. The experience of the last three years shows such a practice to be fundamentally unsound. Release cultures were obtained on all but 2 patients. Although it is probably true that the majority of those persons who are going to become permanent carriers will be found by the conventional two negative cultures during convalescence, there is still the occasional carrier who will be missed by reliance upon this standard. The number of cases of typhoid is now so small that it is feasible to obtain more specimens, especially in those who continue to shed the organisms for any period of time after the acute stages, these being apparently the individuals on whom more than the conventional two specimens are desirable. The goal toward which such efforts should be directed might well be a culture a month for one year after the infection. Under such a plan it is extremely unlikely that a carrier would escape detection. It is increasingly apparent, however, that it is necessary for such specimens to be examined in a laboratory doing enough typhoid work to be familiar with the details of the technique. However competent may be the personnel of a laboratory it is not possible to perform reliable typhoid work unless the number of specimens being examined in a year is large enough to keep the personnel familiar with the details of the technique. The number of cases of the disease in the State today is so small that it is almost impossible for local laboratories to continue to see enough of this work to be familiar with it. It would therefore be extremely desirable if in the near future all release cultures on typhoid patients could be submitted to the State Laboratory for examination.

Year	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases
1930	318	9	2.8	5	1.6
1931	250	6	2.4	4	1.6
1932	214	13	6.1	10	4.7
1933	162	19	11.7	14	8.6
1934	134	18	13.4	13	9.7
1935	112	15	13.4	12	10.7

Year	Reported Cases	Deaths	Living Cases	Number Having Release Cultures	Per Cent Release Cultures
1929	307	42	265	191	72
1930	318	38	280	236	84
1931	250	30	220	192	87
1932	214	25	189	172	91
1933	162	22	140	132	94
1934	134	13	121	118	98
1935	112	10	102	100	98

Undulant Fever.—Forty-two cases of undulant fever were reported as compared with only 15 last year. This increase of over one hundred per cent in the cases may represent either an increased prevalence of the disease or a better recognition of the cases. It is hard to determine which is the principal factor involved, though it is probable that it represents primarily better diagnosis. On investigation of these cases all but 2 gave a history of drinking raw milk. Unfortunately it is not possible to test the herd in every such instance, the farmers being unwilling to consent to the same and there being no law that would make it compulsory. In those instances in previous years when such testing has been carried on infection has been invariably found. In many of the instances where testing of the herd was refused, the history of the herd left no doubt as to its infection with contagious abortion. The problem of preventing undulant fever may be approached from two different angles—either pasteurization of all of the milk or insisting that any raw milk should come from abortus-free herds. The former is far simpler, as the control of contagious abortion is still an unknown quantity, even though encouraging results have recently been reported from vaccination of herds against the disease. In the meantime, undulant fever constitutes in Massachusetts our principal milk-borne disease but it is very much of a local hazard confined to those communities where raw milk is being sold and being limited to those individuals who refuse to face the facts and prefer to use the raw supply. Unfortunately, they are encouraged too often by physicians who should know better. In one instance, however, during the past year a physician who had recommended such a practice became himself the victim of undulant fever.

Whooping Cough.—The reported incidence of whooping cough reached the lowest level since 1924 with only 5,566 cases reported. This was in sharp contradistinction to 1934, when the disease reached the highest reported level in the history of the State. At the same time the deaths fell to a new minimum, with only 67 deaths occurring as contrasted with 125 a year ago and a previous low figure of 88 in 1931.

What may be the factors that have been instrumental in the decline in deaths from whooping cough during the past ten years is very problematical, though it seems very likely that because of the coincidental drop in measles and whooping cough beginning about ten years ago that general hygienic measures, coupled with community education and brought to the public by the public health nursing program, have played a major part in this work. Of the acute communicable diseases, whooping cough today presents the most serious problem, exacting a heavier toll than any of the other childhood diseases other than the primary pneumonias.

Chicken Pox, German Measles, and Mumps.—This group of diseases, while extremely prevalent and much more so than the official figures would indicate, are of importance not because of the toll of life exacted by them but more as a general nuisance to the community. The past year saw the most extensive German measles epidemic of which we have record, reaching a toll of 33,265 cases in this State as compared with a previous maximum of 9,426 cases reported in 1918. The experience in Massachusetts was merely a small part of a general wave that covered the eastern part of the United States. With our present knowledge there is nothing that a health department can do to prevent the spread of the disease, and it is of such slight importance that a department would hardly be justified in spending its limited funds to combat such a situation when the funds might be used to so much better advantage somewhere else in the public health program. There can be no doubt that the conventional measures of isolation of the patient and quarantine of the contacts are utterly ineffective in such a situation, working a needless hardship upon many individuals without at the same time contributing anything to the community. There is certainly far more argument for isolating every common cold and quarantining every member of the family where such a cold occurs than there is for exercising quarantine supervision over German measles cases and contacts. Chicken pox almost equalled the record high figure of a year ago. As the number of reported cases of this disease has been constantly increasing over a period of years, we must conclude that the increase was due not to an increased prevalence but to a more adequate reporting of the cases. Here also the public health importance hardly justifies the precautions that are used in many communities which are just as severe as for more devastating diseases. The reported incidence of mumps has been somewhat low, this disease joining German measles and chicken pox as one for which we pretend to do much but in reality do nothing.

OUTBREAKS

January.—Gastro-enteritis; Reading. Following a church supper a large number of persons ill with nausea, vomiting and severe prostration lasting several days. Chicken salad unquestionably responsible for the illness. No etiologic agent found in the laboratory.

January.—Gastro-enteritis; Norfolk Prison Colony. Repeated short outbreaks of gastro-enteritis, the exact magnitude being hard to determine because of the suspicions that some were feigning illness in order to be relieved of work. Some of the patients had a real diarrhea accompanied by some blood in the stools. Bacteriological work failed to reveal any causative organism though the symptoms strongly suggested a bacillary dysentery.

January.—Hospital in Metropolitan Area. Numerous cases of diarrhea among new born infants, some resulting fatally, the cases occurring over a period of several months. Cause not determined.

January.—Gonococcus infections. A series of infections of infants that left a nursery were subsequently found to have a joint involvement, probably of gonococcal origin. Investigation indicated the most likely manner of spread was through rectal thermometers insufficiently cleansed between patients.

February. Gastro-enteritis; Berkshires and Connecticut Valley. A large number of cases of gastro-enteritis following the consumption of cream puffs and eclairs sold from house to house by a baking company. Cases were characterized by vomiting and prostration, suggestive of staphylococcal origin. Eclairs contained a yellow staphylococcus, broth filtrate of which failed to cause vomiting in monkeys.

February.—Gastro-enteritis; Mt. Hermon School, Northfield. A large number of cases developed at the school. Although the evidence suggested that it was associated with some food that was served, no likely etiological agent was found.

February.—Trichinosis; Reading and Greenfield. Two separate outbreaks of eleven and six cases, respectively. In each case the result of consumption of raw, or improperly cooked, pork from a home grown hog.

February.—Scarlet fever; Hospital in Worcester. Several cases among patients and nurses. Infection probably introduced by a family from Auburn where it was known the disease occurred recently, being spread through the institution by means of one or more carriers among the nursing staff.

March. Puerperal Infections. Nine cases occurred in private patients in a single hospital, three of which resulted fatally. All but one followed an operative delivery. Infections of patients probably furthered by excessive operative interference.

April.—Pneumococcus infections; Colrain. A community outbreak of Type I pneumococcus infections in the village of Griswoldville with several deaths, including that of the village physician. Some cases began as a primary otitis media with a complicating pneumonia, the discharge from the ear yielding a pure culture of Type I pneumococcus. Extensive culturing of family and village contacts indicated rather strongly that disease had been spread largely around the Griswoldville mill rather than around the school.

April.—Pneumococcus infections; Bedford Hospital. A rather extensive outbreak of Type II pneumonia in a single building at the U. S. Veterans Hospital. Studied by the Harvard School of Public Health.

May.—Typhoid fever; Worcester. Investigation of seven reported cases disclosed that they all centered around a single building of an industrial plant, the presumption being that they were infected by water polluted through a faulty cross-connection although there was no evidence at the time of the study to show that any of the cross-connections were failing to work properly.

May.—Gastro-enteritis; Harvard University. A small outbreak in three of the college houses at first thought to be associated with food. Investigation showed that in all probability it was the type of infection known as "intestinal grippe," and probably respiratory spread.

May.—Gastro-enteritis; Boston Psychopathic Hospital. Eighteen cases of gastro-intestinal disturbance among physicians, nurses and patients. The majority occurred one day with sudden onset. Source of infection not found.

June.—Gastro-enteritis; North Adams. An explosive outbreak of fifty cases in a single day in one industrial plant. Examination of the water supply in this plant showed that it was grossly polluted, presumably through faulty cross-connections.

June.—Gastro-enteritis; Norfolk Prison Colony. A mild outbreak of nausea, cramps, diarrhea and dizziness in two different buildings. No common article of food could be incriminated. About thirty-two cases.

August.—Anthrax; Sheffield. Two human cases in veterinarians following the autopsy of cows that died of anthrax. These cows were on a farm where anthrax had occurred some eighteen years prior, this being the probable source of the infection. Information was finally obtained to the effect that during the past year or so workmen employed on the farm where the anthrax developed had dug up bones of previously buried animals.

November-December.—Diphtheria; Chicopee. Thirty-two cases and two deaths due apparently to the fact that after a sustained program of immunization confined largely to the school population an abrupt change was made to preschool immunization without provision for the protection of the unimmunized who had recently attained school age.

December.—Gastro-enteritis; Fairhaven. Numerous cases of gastro-enteritis scattered throughout Fairhaven. Evidence indicated that this was not a food or water infection but was more likely a respiratory spread condition, this being part of a rather widespread incidence of such conditions throughout the New Bedford area.

December.—Gastro-enteritis; Lynn Hospital. During the last half of the year there was a high mortality of new born infants caused by a gastro-enteritis. Outbreak investigated chiefly by Department of Bacteriology at Harvard Medical School. Cause not determined.

Gonorrhea and Syphilis

General Epidemiology.—During 1935 reports of gonorrhea or syphilis were received from 1,239 physicians, as compared to 1,057 in 1934. Thus 20.1 per cent of the 6,044 physicians known to the Department reported one or the other or both of these diseases during the year. Gonorrhea was reported by 876 (14.5%) and syphilis by 703 (11.6%), an increase of 31 in those reporting gonorrhea and an increase of 343 in those reporting syphilis, as compared to 1934. Of the 1,239 reporting, 309 had not reported either disease previously (24.9% of those reporting). Since the first of 1930 when reports were first made directly to this Department, 2,576 different physicians have reported one disease or the other or both at one time or another, which is 42.6% of all the physicians in the State known to the Department.

There was a decrease of 345 cases of gonorrhea from 6,538 in 1934 to 6,193 in 1935, and an increase of 846 cases of syphilis from 4,471 in 1934 to 5,317 in 1935 (Table IX). Physicians reported 48.5% of the gonorrhea as compared to 48.4% last year; clinics reported 42.5% as compared to 43.2% last year; and institutions reported 9% as compared to 8.4% last year. Physicians reported 27.7% of the syphilis as compared to 20.6% last year; clinics reported 52.3% as compared to 65.8% last year; and institutions reported 20% as compared to 13.6% last year. The actual number of cases reported from each of these sources for the past five years is as follows:

Sources of Reports of Syphilis

	Physicians		Clinics		Institutions	
Year	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
1931	1143	25.8	2641	59.5	655	14.7
1932	877	19.4	2779	61.4	871	19.2
1933	913	20.4	2867	64.2	691	15.4
1934	918	20.6	2937	65.8	609	13.6
1935	1472	27.7	2783	52.3	1062	20.0

Although reports from clinics declined 154, those from physicians increased 554, and those from institutions increased 453. So far as the physicians are concerned, this sudden increase may be accounted for by the fact that during the greater part of this year report forms have been included with each positive blood test sent out from the Department's serological laboratory and improvement in reporting was noted almost immediately following the inauguration of this procedure.

Of the 355 communities in the State, only 68 reported no cases of either gonorrhea or syphilis, as compared to 72 last year and 101 the year before.

There were 177 deaths from syphilis at a death rate per 100,000 population of 4.1. If deaths from general paralysis of the insane and tabes dorsalis are included, the total of deaths from syphilis was 344 at a rate of 7.9 per 100,000 population.

At first glance it would appear that the recently reported decline in the prevalence of syphilis in Massachusetts had halted. The rate for early syphilis per 100,000 population for 1935 is 25.4 compared to 24.3 in 1934 and 28.2 in 1933, the lowest figure prior to 1934. However, the increase in total reports this year is accounted for largely by the fact that there was nearly a 100% increase in the number of physicians reporting syphilis. This increase in reporting physicians (in the face of a previous decline in reporting physicians) is due to two factors. Early this year letters were written to 239 physicians who had ordered arsenicals from the Department but had never reported syphilis. Seventy-nine of these reported syphilis during 1935. The second factor has been the enclosure of a report form, this year, with all positive blood test reports to physicians. Immediately upon the inauguration of this policy the reporting of syphilis increased.

It is reasonable to assume that the increase in reporting of syphilis affected all stages alike, because neither arsenicals nor positive blood tests would influence the better reporting of any particular stage of the disease. Consequently, it is reasonable also to determine the reported prevalence of early syphilis on the basis of a constant number of total reports of syphilis over the six years. Such a correction of the reported rate of early syphilis has been accomplished by determining the percentage of early syphilis for each year. This percentage for each year has then been applied to the average number of all forms of syphilis reported for the past six years. The resulting figure is considered to be the number of early cases which would have been reported if the total reports had been constant. The results of this statistical correction are as follows:

Corrected Rates for Early Syphilis

Year	Total Cases Reported	Cases Reported	Percentage of Total	Rate per 100,000 Population	Average Total Cases	Estimated* Early Cases	Corrected Rate per Population
1930	4299	1521	35.4	34.9	4586	1623	37.3
1931	4439	1471	33.1	33.5	4586	1519	34.4
1932	4527	1405	31.0	31.6	4586	1423	31.9
1933	4471	1235	27.6	28.3	4586	1268	28.8
1934	4464	1072	24.0	24.3	4586	1102	24.8
1935	5317	1157	21.8	25.4	4586	1001	21.9

* Estimated by applying each annual percentage of early syphilis to the average total.

Two things are to be noted in this table, the first, that the percentage of early syphilis has steadily declined, and second, that the corrected rate of early syphilis per 100,000 population indicates a continued decline in the prevalence of the early stages of the disease.

Clinics.—The Lowell and Lynn Clinics were without adequate follow-up service for two or three months at the end of the year, due to resignations. No new clinics have been opened, none of the previously existing clinics have been closed, and no new follow-up service has been added to any clinic during the year.

The twenty-six clinics in the State admitted 2,708 new cases of gonorrhea and 2,721 new cases of syphilis, a total of 5,429, as compared to 5,995 in 1934, a decrease of 566, which decrease was almost equally divided between syphilis and gonorrhea. These patients made 272,928 visits as compared to 268,520 in 1934, an increase of 4,408 over last year. The total attendance at these clinics was 15,516 different individuals as compared to 13,585 in 1934. This increase of nearly 2,000 in individuals attending the clinics, together with the increase in the number of visits made and compared with the decline in new admissions, indicates that the progressive improvement in attendance which has been noted over the years is being well maintained.

Subsidy to the Boston City Hospital and the Massachusetts General Hospital was discontinued on the first of April. That of the Boston City Hospital was discontinued because that institution is not supposed to accept patients who are non-residents of Boston, which is contrary to the standards, required by the Department, of subsidized clinics. That of the Massachusetts General Hospital was discontinued because the small subsidy of $800 per year amounted to very little compared with the hospital's clinic budget of some $60,000 a year, whereas the $800 would go a long way in improving the service of some small clinic outside of the Boston Metropolitan Area.

The subsidy of the Boston Dispensary was increased in order that a nurse might be employed to attend the fever machine, at the Boston Psychopathic Hospital, recently acquired for the treatment of patients with syphilis, but not of the central nervous system. This work in fever treatment will be discussed in more detail elsewhere in this report.

Fever Therapy.—Early this year Dr. Harry C. Solomon, representing the Department of Mental Diseases, and Dr. N. A. Nelson, representing the Department of Public Health, visited Dayton, Ohio, for a two-day study of the fever therapy which had been carried on there for some three years. As a result of this visit and of a previous conversation between Dr. Chadwick and Dr. Paul de Kruif, two General Motors Kettering Hypotherms were allocated to Massachusetts at a nominal initial fee. These machines were installed at the Boston Psychopathic Hospital in order that they might be under the direct supervision of Dr. Solomon, who has had many years of experience with various fever-producing procedures in the treatment of syphilis.

One of the machines is to be devoted primarily to the treatment of patients with neurosyphilis selected by the Psychopathic Hospital. The other is to be used primarily for the treatment of patients with other forms of syphilis, selected, in the beginning at least, from the Boston Dispensary.

The Department of Mental Diseases sent a nurse and a physician to Dayton for two weeks for detailed instruction in the technique of operating the machine, and the Boston Dispensary appointed a nurse to attend the second machine, which nurse received her instructions from the Boston Psychopathic Hospital nurse who was in Dayton.

Up to the end of the year, twelve patients had been referred for fever treatment by the Boston Dispensary. It is becoming apparent that it is so difficult to persuade patients to accept fever therapy that the Boston Dispensary will not be able to provide sufficient material to keep the single machine in constant use. Invitations have been made to the Massachusetts General Hospital and the Peter Bent Brigham Hospital, and will be made to the Boston City Hospital, to send patients to the Psychopathic Hospital for fever treatments.

Boards of Health.—Although no figures are available for 1935, it is quite generally agreed among the various clinics that boards of health in increasing numbers are assuming their responsibility for the cost of treatment of indigent patients. If the present settlement laws can be amended as recommended by this Department, much of the existing confusion as to who is responsible for the treatment of these patients will be eliminated.

One hundred and forty boards of health followed 3,637 persons reported by name for having prematurely discontinued treatment or as having been in contact with infected persons. This is an increase of 59 cases over last year. Of the 3,637, only 1,719 (47.3%) could be found. No final reports of the results of their investigations could be obtained from 38 cities and towns in 182 (5.0%) of the cases.

If clinic follow-up service can be increased more nearly to the point of adequacy a large part of this tremendous amount of work may be saved since better follow-up results in fewer lapses, and cases followed to a conclusion by the clinic staff will not require follow-up by this Department and local boards of health as at present.

Arsenicals.—The total distribution of arsenicals increased from 54,896 grams in 1934 to 55,830 grams in 1935. Physicians received 22% of the arsenicals distributed, as compared to 19.2% last year and 16% the year before. This year 489 different physicians applied for arsenicals as compared to 418 the year before. Of the 489, 397 (81.2%) have reported syphilis at one time or another and 277 (56.6%) reported syphilis in 1935. Last year only 65.2% of the 418 physicians using arsenicals had ever reported syphilis. This improvement may be due in part to a letter sent to 239 users of arsenicals who had never reported syphilis, more than a third of whom promptly reported. Many of the remaining two-thirds have not reordered arsenicals.

A new arsenical, Mapharsen, manufactured by Parke, Davis and Company, has appeared on the market after some three years of study. A number of clinics have joined with the Department in an effort to add to the data which is accumulating as to the therapeutic efficiency of this new drug. Its alleged "superiority" over standard arsenicals is said to lie in the fact that it contains only one tenth of the amount of arsenic per dose, causes few if any nitritoid reactions, and no more other reactions than the other arsenicals. It is said not to become toxic on standing and it is so far admitted to be a chemical of constant molecular composition that it does not require testing by the National Health Institute of the United States Public Health Service. If this drug proves to be as "fool-proof" as it is claimed to be and the therapeutic equivalent, at least, of neoarsphenamine, it will deserve serious consideration as a standard arsenical. The experiment being conducted by the Department, in cooperation with several clinics, is to be a controlled one in that Mapharsen treated cases will be compared with similar cases treated with ordinary arsenicals.

Laboratory.—The Wassermann Laboratory reported 130,669 blood and spinal fluid examinations (nearly 11,000 more than in 1934), and the Bacteriological Laboratory reported 10,741 smears examined for gonorrhea, an increase of nearly 1,100 over 1934.

During the year the United States Public Health Service conducted an evaluation of the several important serological tests in the United States, as performed by their originators. The Hinton test stood well up among the leaders in specificity, which seems to confirm the Department's action in adopting the Hinton test, nearly two years ago, as the routine serological test for syphilis in the State Laboratory.

Education and Information.—During the year the staff of the Subdivision lectured to 57 different groups, chiefly professional, such as nurses, medical students and physicians, some 4,400 persons attending these lectures. In addition many thousands of persons were reached by the Public Health Education Worker who, as full-time lecturer jointly for this Department and the Massachusetts Society for Social Hygiene, is constantly in the field.

During the year 71,750 pieces of literature were distributed by the Subdivision.

Training of Personnel.—There is a serious lack of personnel trained in the control of gonorrhea and syphilis. This lack is particularly obvious whenever a clinic loses a follow-up worker and a new one is sought. It is also obvious in the ridiculous approaches made by some public health workers to case problems. As the program for the control of gonorrhea and syphilis develops and broadens, there will be a constantly increasing need for trained personnel. This problem has been discussed with representatives of Simmons College and as a result the School of Nursing has announced a six weeks' course of lectures and field instruction for public health nurses who wish some training in this field. The course will be offered during the coming summer.

Several of the clinics in the State, particularly those in the Boston Metropolitan Area, have been most cooperative in offering instruction to newly appointed follow-up workers in other clinics who need more training than they have had.

United States Public Health Service: The Assistant Director, Dr. Nelson, has been made a member of the Advisory Committee to the United States Public Health Service which met this year in Washington to draw up State and local programs for the control of gonorrhea and syphilis, having in mind particularly that funds which may be available under the Social Security Act will permit of the expansion of existing programs.

Dr. Nelson also presented a paper on "The Decreasing Prevalence of Syphilis in Massachusetts" to the Annual Conference of State and Territorial Health Officers in Atlantic City, and at the same time attended the first annual meeting of the year-old American Neisserian Medical Society which grew out of the now five-year-old Massachusetts Neisserian Medical Society.

He has also addressed several public health groups in New York State as well as a conference of nurses from the Atlantic seaboard which was held in New York City under the auspices of the National Organization for Public Health Nursing.

Lobar Pneumonia Study

The past year has seen the completion of the five-year study of lobar pneumonia that has been financed by the Commonwealth Fund. The principal purposes of this study were the collection of additional data as to the clinical value of pneumonia serum and the feasibility of its use other than in the larger hospitals, the development of a plan for its distribution on a state-wide basis, and improvement of methods of serum production. This latter phase has been handled by the Division of Biologic Laboratories.

The figures obtained in the early part of the study showed that through the use of this serum the fatality rate of Type I lobar pneumonia might be reduced over 50 per cent in those treated within the first four days of the illness. A total of over 500 cases had been so treated by the end of the year, the crude fatality rate for this series being 11.1 per cent as contrasted with a fatality rate in untreated cases of 25 per cent. During the past year the serum has been made available on a broader scale, whereby in some sections of the State any physician might obtain the same for a suitable case. Although the series of these as contrasted with the cases treated earlier by those physicians who were collaborating in the study is still small, the fatality rate, while slightly higher, is distinctly lower than in the untreated group, indicating that such a serum can be used by the general practitioner of medicine in materially reducing the fatality rate from this disease. The figures for Type II pneumonia, while not as striking, indicate also a very substantial reduction in the fatality rate through serum treatment. In both groups the reduction in fatality rate is especially significant in those cases having a bacteremia, those cases without treatment being especially dangerous from the point of view of human life.

The study in its early stages was based entirely upon the use of serum by physicians especially chosen to collaborate in this work. As was outlined in last year's report, this plan has, as the study progressed, been modified so as to make the serum available for any physician having a Type I or II case ill not longer than four days. As this plan worked satisfactorily in the areas where tried, it has been extended so that as the year closes serum is available in all parts of the Commonwealth. This has meant the necessity of training technicians from local hospitals, the technician coming to the Diagnostic Laboratory for this work. Typing service is now available in fifty-five hospitals outside of Boston, all of these hospitals doing typing not only for the patients actually in the hospitals but accepting sputum brought to the hospital from patients ill outside. The uniform use of the Neufeld method has eliminated the long delay formerly required for typing and has made it possible to distribute the serum through the laboratories doing the typing, the serum being issued on the basis of the typing results. In the city of Boston seven hospitals are doing typing, most of which accept sputum only from patients resident in the hospital. The facilities of the State Diagnostic Laboratory are available for non-hospital patients. This laboratory accepts specimens from all patients of the State and is equipped to do typings at all hours if necessary.

During the past year those portions of the study that are being carried on as an essential service within the community have been taken over as an integral part of the State budget. Thus as the year ends and the formal study comes to a close, pneumonia serum is available throughout the Commonwealth and local facilities have been established whereby its use may be facilitated through the aid of laboratory examinations, an assistance which was formerly almost unavailable. The formal close of the study does not mean, however, that there is no further responsibility for gathering and analyzing data as to the results of this type of serum treatment. There will be need for this for years to come and it now devolves upon the regular staff of the Department to carry on these studies, even though on a somewhat reduced scale.

Milk

There have been during the year no specific outbreaks of milk-borne disease, this being the second consecutive year without such cases. There has been, on the other hand, an increasing number of recognized cases of undulant fever, the majority of which were due to the consumption of infected raw milk. Thus milk-borne disease is still a problem of some magnitude in the State and is becoming increasingly so as more and more cases of undulant fever are being recognized.

The only type of control at present available for these cases as well as for other types of milk-borne infections lies in pasteurization. It is encouraging to report that there has been during the past year an increasing interest on the part of boards of health in regulations calling for the pasteurization or certification of all milk. Such regulations are now in force in twenty-one communities as follows: Ayer, Boston, Brookline, Cambridge, Chelsea, Dedham, Everett, Fall River, Framingham, Lexington, Lowell, Milton, Natick, Newton, Salem, Stoneham, Swampscott, Waltham, Watertown, Wellesley, Winchester. In addition, Malden, Revere and Winthrop have adopted such a regulation to take effect at the beginning of the new year, and New Bedford to take effect May 1, 1936. There is much interest in such a regulation in a number of other communities and it seems possible that within the not too distant future many more communities will require that all milk sold locally shall come up to such standards.

In last year's report attention was called to the Attleboro situation, where a regulation of the local Board had been challenged in the court. The decision in favor of the Health Department was appealed to the Supreme Court, but the plaintiffs lost their nerve before the case was called and withdrew the appeal. The only reward for Dr. Hewitt, who as Health Officer of Attleboro was obliged to face the court proceedings, was his removal as Health Officer by the newly elected Mayor, one of whose campaign issues had been raw milk. Although Dr. Hewitt's activities were not appreciated locally the rest of the State is very much indebted to him for having established in a court of law the reasonableness and validity of this type of regulation.

Of considerable significance in the problem of milk sanitation was the milestone that was reached in the State bovine tuberculosis program under the Division of

Livestock Disease Control, now in the Department of Agriculture. On December 1st Massachusetts became a modified accredited area. Thus all of the cows in the State are now under test, and so long as the State continues as a tested area, as there is every reason to believe it will, there is no longer any need for the local regulations sponsored several years ago by the Department requiring pasteurization or tuberculin testing. These regulations served an extremely useful purpose in improving the quality of the milk but have now outlived their usefulness other than as incentives to the continuation of Massachusetts in an accredited area.

District Health Officers

No formal changes have been made in the duties of the District Health Officers during the past year, the district lines staying as before. With the failure of a few of the Southern Berkshire towns to join the district it was necessary, however, for Dr. Lee to give more attention to these than in former years. A further responsibility taking considerable time on the part of some of the District Health Officers was that in connection with the organization of cancer committees in conjunction with the work of the Division of Adult Hygiene. Ultimately this program must affect all of the districts but for the time being it has weighed particularly heavily on Dr. Miner, where some of the first work along this line has been centered. The usual inspections of jails and lock-ups and isolation hospitals have been carried on. The District Health Officers' anticipated load of work in conjunction with the shifting of the childhood tuberculosis clinics from a State to local basis was not as great as had been anticipated, the local communities with the assistance of the Sanatoria staffs assuming practically all of the load of this work after the District Health Officer had interested the community in making application for such service.

District Health Units

The past year has seen further growth in the District Health Units in the Berkshire and Nashoba Areas. The town meetings of 1935 saw three additional towns joining the Southern Berkshire District, namely Alford, Otis and West Stockbridge, thus bringing the unit to a total of ten towns, embracing 10,385 population. Considerable interest has developed in other Berkshire towns so that it is possible that the 1936 town meetings will see other towns joining the district. Thus the towns of Lanesborough, Hinsdale, Washington and Peru have asked for a demonstration of this unit service, a demonstration which has been going on during the latter part of the year. Considerable interest has also been elicited in Williamstown and in Adams. In keeping with the idea of expanding the unit throughout the towns of Berkshire County, the name has been changed to that of the "Berkshire Health Unit." Only time will tell to what extent it may develop into a definite county unit, but it would seem that many of the difficulties heretofore met could be overcome if the unit were broadened out on a county-wide basis so as to include all of the towns, though not the two cities, of Berkshire County.

The first expression of the voters in the Nashoba Area was asked for at the 1935 town meetings, with the result that ten of the fourteen towns voted to form a district, Boxborough, Harvard, Littleton and Stow failing to join in the district plan. Since that time there has been definite interest expressed in Littleton so that the unit has continued to offer service in this town at the request of the Board of Health. The other three towns have definitely withdrawn from the enterprise. Just as significant as the large number of the towns voting to join the district was the fact that these towns voted to take over the total share of the cost in 1936 rather than assuming a gradually increasing proportion over a period of years as in the Berkshires. This means that there is in the Nashoba District a union of ten towns embracing a population of 18,451 persons and that with the advent of the new year this unit can be entirely self-supporting aside from the slight contribution made by the State toward the salary of the Health Officer.

Considerable interest has developed in Franklin County over the possibility of a health unit in that area. The matter is to be presented at the 1936 town meetings, though it is too early at this time to forecast what may be the public response. With the passage of the Social Security Act by the 1935 Congress there is promise of financial assistance for such cooperative health units. It is expected that it will be possible through that fraction of the money allocated to Massachusetts to be able to further develop not only the Berkshire and Nashoba Units, but also to make possible the establishment of the Franklin County and possibly other units. In the meantime, the Commonwealth Fund which has been underwriting the Southern Berkshire and the Nashoba Units, has indicated its willingness to continue support in the former, such support in the latter being no longer necessary.

In the Barnstable County Unit there has been little change during the year and little prospect of change. The principal needs at present are a more scientific type of milk control and a further coordination of the nursing services.

Board of Health Records

The project that was begun in 1934 whereby, under the auspices of the Commonwealth Fund, services of a field clerk were available for assistance to boards of health in their local records has been continued with growing success during the past year. Miss Helen M. Smith, who has been assigned to this work, has not only paid return visits to many communities contacted in 1934, but has also worked with the records of the Boards of Health of Bridgewater, Fitchburg, Gloucester, Middleborough, Maynard, Rockport, Taunton and Greenfield. In some instances it was almost impossible to bring order out of the chaos that existed as to the diphtheria immunization records, but a basis was established whereby the record system in the future will be infinitely improved and probably continue on a self-sustaining basis from year to year.

Clinics and Dispensaries

For a number of years it has been the responsibility of the Department to license clinics and dispensaries, a function which has been delegated to this Division because of the District Health Officers. This law, when originally passed, served a very useful purpose in eliminating many irresponsible clinics. It then entered into a period of quiescence when there was little change from year to year. During the period of economic unrest of the last few years a tendency has developed on the part of many physicians to designate their offices as a clinic, this being done merely for business purposes. It has been the feeling of the Department that a clinic as conceived by the public represented group practice and could not be construed as indicating a doctor's private office. Thus the New Bedford physician who wished to glorify his office under the name of "The New Bedford Tonsil Clinic" rather than using his own name has been considered as seeking to use the name "clinic" to imply to the public a type of organization or service that did not actually exist. A number of such requests have been made and in each instance refused. With the improvement in the economic conditions the past year has seen fewer of these requests, though it has been necessary in several instances to require physicians to discontinue such a practice where they had started it unaware of the clinic law. The principal difficulty today exists with those clinics that are operating under a clinic organization but which are designed merely as feeders for the private offices of physicians connected therewith. No ready solution has been found to combat this type of evil.

Bacteriological Laboratory

With 38,264 specimens examined during 1935 the Bacteriological Laboratory handled the largest load of work since it was established. There was a general increase in all types of specimens submitted except for diphtheria. The actual load on the laboratory was, however, even greater than is indicated by the crude figures, as the increase was very largely in those types of examination that are most time consuming. This means that, if the laboratory is to continue to render the same type of service, provisions must be made for increased space and personnel.

The Pneumonia Study, which comes to an end this year, has placed an additional load upon the laboratory for the past five years, a load which must be assumed in large part in years to come without the assistance of outside funds. One of the two bacteriologists employed on this has been taken over on the State budget. As the other position is being abolished this must mean that pneumonia typing in the future will become very largely a routine type of work without the opportunities that have existed in the past five years for extensive cross-checking as to the relative values of typing methods. The past five years' work has, however, yielded sufficient evidence as to the validity of the rapid Neufeld method that there is probably little need for further routine checking along this line. With the growing interest in pneumonia, however, it has become necessary that typing service be available other than during the hours in which the laboratory is usually open. A plan has been worked out during the year whereby sputum typing is available in emergency cases at any hour. It is true that this service at all hours is of real assistance only to the Metropolitan Area, but similar service is available in many hospital laboratories in other parts of the State so that there should be no real difficulty at any time in obtaining prompt typing.

With the growing interest in undulant fever the number of specimens for abortus agglutination has increased, as has also the number of positive results. Notable in this connection was the isolation during the past year of the Brucella abortus from a culture taken from the fallopian tube of a patient having a positive agglutination test, this patient being operated upon for an abdominal mass which probably had no relationship to the abortus infection.

Considerable work has been done during the past year with reference to cultural methods for isolation of tubercle bacilli. The usual number of specimens for food poisoning have been examined, all but one of which yielded absolutely negative results. The one exception yielded a yellow staphylococcus, the pathogenicity of which could, however, not be demonstrated.

PUBLIC HEALTH EDUCATION

During the past year speakers in the Division gave 100 talks, exclusive of those referred to under Gonorrhea and Syphilis. Over 9,200 people were reached. In addition, twelve radio talks were given.

TABLE I.—*Anterior Poliomyelitis*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1931	1,428	33.4	114	2.7	8.0
1932	61	1.4	13	0.3	21.3
1933	353	8.2	32	0.7	9.1
1934	76	1.8	9	0.2	11.8
1935	1,390	31.9	61	1.4	4.4

TABLE II.—*Diphtheria*

1931	2,381	55.7	130	3.0	5.5
1932	1,811	42.1	107	2.5	5.9
1933	1,041	24.1	86	2.0	8.3
1934	629	14.5	50	1.2	7.9
1935	390	8.9	26	0.6	6.7

TABLE III.—*Epidemic Cerebrospinal Meningitis*

1931	101	2.4	30	0.7	29.7
1932	83	1.9	34	0.8	41.0
1933	50	1.2	25	0.6	50.0
1934	66	1.5	28	0.6	42.4
1935	83	1.9	55	1.3	66.3

TABLE IV.—*Gonorrhea*

1931	7,201	168.4	5	0.1	
1932	6,738	156.8	4	0.1	
1933	6,591	152.6	7	0.2	
1934	6,538	150.6	11	0.3	
1935	6,193	142.0	7	0.2	

TABLE V.—*Lobar Pneumonia*

1931	3,873	90.6	1,718	40.2	44.4
1932	4,028	93.7	1,688	39.3	41.9
1933	4,277	99.0	1,825	42.3	42.7
1934	3,976	91.6	1,601	36.9	40.3
1935	4,370	100.2	1,731	39.7	39.6

TABLE VI.—*Measles*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1931	16,581	387.7	64	1.5	0.4
1932	19,763	459.9	64	1.5	0.3
1933	15,067	348.9	27	0.6	0.2
1934	44,817	1,032.6	91	2.1	0.2
1935	12,352	283.2	37	0.8	0.3

TABLE VII.—*Scarlet Fever*

1931	12,782	298.9	101	2.4	0.8
1932	16,580	385.8	145	3.4	0.9
1933	12,284	284.4	108	2.5	0.9
1934	8,391	193.3	76	1.8	0.9
1935	8,304	190.4	57	1.3	0.7

TABLE VIII.—*Smallpox*

1931	6	0.1	–	–	–
1932	43	1.0	–	–	–
1933	–	–	–	–	–
1934	–	–	–	–	–
1935	–	–	–	–	–

TABLE IX.—*Syphilis*

1931	4,447	104.0	168	3.9
1932	4,530	105.4	162	3.8
1933	4,466	103.4	154	3.6
1934	4,471	103.0	159	3.7
1935	5,317	121.9	177	4.1

TABLE X.—*Tuberculosis, Pulmonary*

1931	4,421	103.4	2,306	53.9
1932	3,994	92.9	2,041	47.5
1933	3,541	82.0	2,059	47.7
1934	3,585	82.6	1,902	43.8
1935	3,592	82.4	1,813	41.6

TABLE XI.—*Tuberculosis, Non-Pulmonary*

1931	555	13.0	248	5.8
1932	466	10.8	260	6.0
1933	466	10.8	222	5.1
1934	448	10.3	214	4.9
1935	387	8.9	148	3.4

TABLE XII. — *Typhoid Fever*

1931	250	5.8	30	0.7	12.0
1932	214	5.0	25	0.6	11.7
1933	162	3.7	22	0.5	13.6
1934	135	3.1	13	0.3	9.6
1935	112	2.6	10	0.2	8.9

TABLE XIII.—*Whooping Cough*

1931	7,174	167.8	88	2.1	1.2
1932	7,881	183.4	107	2.5	1.4
1933	9,834	227.7	97	2.2	1.0
1934	12,659	291.7	125	2.9	1.0
1935	5,566	127.6	67	1.5	1.2

TABLE XIV.—*General Paralysis of the Insane*

YEAR	DEATHS		FIRST ADMISSIONS TO STATE INSTITUTIONS FOR MENTAL DISEASES		
	Deaths	Death Rate per 100,000	First Admissions	Rate per 100,000	Per Cent of All First Admissions
1931	166	3.9	203	4.8	6.4
1932	166	3.9	206	4.8	6.6
1933	147	3.4	209	4.8	6.5
1934	161	3.7	226	5.2	6.9
1935	128	2.9	281	6.4	4.9

TABLE XV.—*Gonorrhea and Syphilis Treated in Clinics and Institutions*

Clinics

YEAR	NEW CASES		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1931	3,040	2,631	206,433	25
1932	2,978	2,876	249,263	26
1933	3,117	3,063	261,867	26
1934	3,003	2,998	268,520	26
1935	2,631	2,783	272,928	26

Institutions

YEAR	New Cases		Visits	Number of Clinics
	Gonorrhea	Syphilis		
1931	436	823	–	24
1932	522	987	–	24
1933	464	946	–	24
1934	435	803	–	24
1935	557	1,062	–	24

TABLE XVI.—*Grams of Arsphenamine, Sulpharsphenamine and Neoarsphenamine Distributed*

YEAR	Arsphenamine	Sulpharsphenamine	Neoarsphenamine	Total
1931	9,235	13,676	26,987	49,898
1932	8,681	8,394	27,815	44,890
1933	7,984	4,339	37,080	49,403
1934	8,037	4,453	42,407	54,897
1935	7,138	3,508	45,184	55,830

TABLE XVII.—*Grams of Arsenicals, Distributed to Clinics, Institutions and Physicians*

YEAR	Clinics and Institutions	Physicians
1931	40,714	9,183
1932	36,903	6,987
1933	41,549	7,854
1934	44,284	10,613
1935	43,000	12,830

Table XVIII.—*Laboratory Examinations*—1935

	Positive	Negative	Total for 1935	Total for 1934
Diphtheria:				
Diagnosis	84	5,409	5,493	6,592
Release	273	564	837	2,995
Tuberculosis:				
Sputum	834	4,650	5,484	5,243
Animal Inoculations	26	263	289	223
Typhoid Fever:				
Widal	120	2,656	2,866*	2,142**
Culture (blood, feces, urine, etc.)	152	6,226	6,378	6,047
Gonorrhea	2,044	8,697	10,741	9,683
Malaria	1	52	53	52
Pneumococcus type determinations	–	–	1,665	1,257
Hemolytic streptococci	–	–	2,322	1,906
Spinal fluid for meningococci	–	–	14	15
Undulant fever	111	631	742	457
Miscellaneous			1,380	1,187
Total			38,264	37,799

* Includes 90 atypical.
** Includes 91 atypical.

Table XIX.—*Laboratory Examinations for Rabies**

Year	Positive		Negative	Total Animals Examined
	Dogs	Other Animals		
1931	290	14	211	515
1932	125	6	130	265
1933	139	5	153	301
1934	242	9	234	497
1935	187	16	232	491

* Wassermann Laboratory.

Cases and Deaths, with Case and Death Rates per 100,000 Population for Reportable Diseases During the Year 1935*

DISEASES	Cases	Case Rate per 100,000 Population	Deaths	Death Rate per 100,000 Population	Fatality Rate (Per Cent)
Actinomycosis	3	0.1	3	0.1	100.0
Anterior Poliomyelitis	1,390	31.9	61	1.4	4.4
Anthrax	3	0.1	–	–	–
Chicken Pox	10,836	248.4	9	0.2	0.1
Diphtheria	390	8.9	26	0.6	6.7
Dog Bite	10,481	240.3	–	–	–
Dysentery, Amebic	12	0.3	1	–**	8.3
Dysentery, Bacillary	24	0.5	6	0.1	25.0
Encephalitis Lethargica	16	0.4	16	0.4	100.0
Epidemic Cerebrospinal Meningitis	83	1.9	55	1.3	66.3
German Measles	33,265	762.7	6	0.1	–**
Gonorrhea	6,193	142.0	7	0.2	–
Hookworm	1	–**	–	–	–
Lobar Pneumonia	4,370	100.2	1,731	39.7	39.6
Malaria	17	0.4	1	–**	5.9
Measles	12,352	283.2	37	0.8	0.3
Mumps	5,620	128.8	3	0.1	0.1
Ophthalmia Neonatorum	1,076***	24.7	–	–	–
Paratyphoid Fever	5	0.1	1	–**	20.0
Pellagra	17	0.4	16	0.4	94.1
Rabies	2	0.1	2	0.1	100.0
Scarlet Fever	8,304	190.4	57	1.3	0.7
Septic Sore Throat	195	4.5	39	0.9	20.0
Smallpox	–	–	–	–	–
Syphilis	5,317	121.9	177	4.1	
Tetanus	22	0.5	20	0.5	90.9
Trachoma	31	0.7	–	–	–
Trichinosis	47	1.1	2	0.1	4.3
Tuberculosis, Pulmonary	3,592	82.4	1,813	41.6	
Tuberculosis, Other Forms	387	8.9	148	3.4	
Tuberculosis, Hilum	622	14.3	–	–	–
Typhoid Fever	112	2.6	10	0.2	8.9
Typhus Fever	2	0.1	–	–	–
Undulant Fever	42	1.0	1	–**	2.4
Whooping Cough	5,566	127.6	67	1.5	1.2
	110,395	2,531.0	4,315	98.9	

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* Population, 4,361,570.

** Less than .05.

*** 30 of these were gonorrheal ophthalmia.

Cases and Deaths for all Reportable Diseases by Months — 1935

	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Actinomycosis	2	–	–	1	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	1	–	–	3	3
Anterior Poliomyelitis	2	–	2	–	–	1	1	–	3	2	5	1	46	1	481	20	536	18	235	7	58	6	21	5	1390	61
Anthrax	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	1	–	3	–
Chicken Pox	1899	2	1202	–	1149	1	1081	–	1129	1	1051	1	379	1	97	–	99	–	351	1	861	–	1538	2	10836	9
Diphtheria	35	6	39	–	29	–	25	2	38	3	34	1	30	1	22	3	18	–	33	–	35	5	52	5	390	26
Dog Bite	450	–	506	–	716	–	1103	–	1316	–	1327	–	1208	–	1117	–	793	–	804	–	654	–	487	–	10481	–
Dysentery, Amebic	1	–	–	–	2	–	1	–	1	–	–	–	1	–	–	–	2	–	1	1	1	–	2	–	12	1
Dysentery, Bacillary	–	1	–	–	4	1	5	–	1	1	1	–	1	–	2	–	7	2	2	1	1	–	–	–	24	6
Encephalitis Lethargica	1	1	1	1	2	–	1	3	1	–	–	3	1	1	2	2	2	1	2	–	1	1	2	3	16	16
Epidemic Cerebrospinal Meningitis	4	5	2	6	9	2	9	4	10	5	2	3	8	1	4	5	7	5	13	5	5	3	10	11	83	55
German Measles	810	–	1908	–	5120	2	8695	2	9786	–	5898	1	687	1	89	–	46	–	39	–	94	–	93	–	33265	6
Gonorrhea	468	–	360	–	513	–	508	1	524	1	526	–	594	1	546	–	553	–	595	2	476	–	530	2	6193	7
Hookworm	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lobar Pneumonia	691	272	475	223	501	198	539	189	428	168	272	100	163	51	123	34	105	57	259	108	248	113	566	218	4370	1731
Malaria	1	–	1	–	–	–	1	–	–	–	2	–	1	–	1	–	2	–	4	1	3	–	1	–	17	1
Measles	1246	2	2097	4	1874	8	2157	7	1751	7	1486	7	595	–	130	–	51	–	179	–	303	–	483	2	12352	37
Mumps	304	–	290	–	532	–	486	2	674	–	406	–	241	–	225	–	217	–	333	1	674	–	1238	–	5620	3
Ophthalmia Neonatorum	133	–	49	–	106	–	61	–	126	–	152	–	36	–	77	–	76	–	78	–	69	–	113	–	1076	–
Paratyphoid Fever	–	–	–	–	1	–	–	–	–	–	1	1	–	–	–	–	1	–	–	–	2	–	–	–	5	1
Pellagra	1	–	–	–	1	–	1	4	4	1	1	1	3	4	2	3	2	1	–	–	–	–	2	2	17	16
Rabies	–	–	–	–	1	1	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2
Scarlet Fever	774	7	723	7	1066	9	1028	6	980	4	742	9	281	4	174	–	218	2	551	2	756	2	1011	5	8304	57
Septic Sore Throat	12	7	18	1	38	5	31	4	18	5	16	3	15	–	7	1	11	4	8	2	9	4	12	3	195	39
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	410	18	379	16	556	15	498	16	399	18	418	13	339	10	444	18	462	8	511	11	464	12	437	22	5317	177
Tetanus	2	3	1	–	–	–	–	1	1	1	1	2	4	4	3	1	3	1	2	3	2	4	3	–	22	20
Trachoma	1	–	2	–	3	–	–	–	1	–	2	–	7	–	3	–	3	–	5	–	2	–	2	–	31	–
Trichinosis	5	–	22	1	4	–	1	–	–	–	1	–	1	–	2	–	3	–	3	1	3	–	2	–	47	2
Tuberculosis, Pulmonary	279	154	316	160	311	172	293	166	334	151	312	145	321	167	319	136	257	125	303	148	257	125	290	164	3592	1813
Tuberculosis, Other Forms	27	8	38	12	38	19	29	12	49	11	26	18	27	12	35	16	31	12	41	11	26	9	20	8	387	148
Tuberculosis, Hilum	31	–	36	–	69	–	60	–	63	–	57	–	60	–	58	–	29	–	57	–	69	–	33	–	622	–
Typhoid Fever	6	–	1	–	6	1	13	–	15	2	6	1	13	2	15	1	12	2	13	–	7	1	5	–	112	10
Typhus Fever	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	2	–
Undulant Fever	1	–	3	–	2	–	6	–	3	–	3	–	3	–	2	–	3	–	8	–	2	–	6	1	42	1
Whooping Cough	839	8	817	9	777	7	522	10	504	7	361	5	347	5	293	5	254	2	286	1	274	4	292	4	5566	67
Totals	8435	494	9289	441	13431	442	17155	429	18160	389	13109	316	5413	266	4276	245	3804	240	4716	306	5357	290	7252	457	110397	4315

Cases of Reportable Diseases by Ages for 1935

	Under 1 Year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	Age Unknown	Total	Male	Female	Unknown
Anterior Poliomyelitis	23	68	108	126	123	88	93	116	86	74	298	98	42	20	11	10	–	1	1	–	4	1390	824	566	–
Chicken Pox	288	403	541	661	783	1309	1965	1481	887	565	1019	193	69	36	21	31	7	2	1	1	573	10836	5545	5255	36
Diphtheria	2	19	20	33	29	30	26	27	17	16	35	23	19	12	18	23	8	4	4	1	24	390	182	208	–
Dysentery, Amebic	1	–	–	–	–	–	–	–	–	1	–	1	1	1	2	2	1	2	–	–	–	12	11	1	–
Dysentery, Bacillary	2	1	4	–	2	2	1	2	4	1	3	–	–	1	–	–	1	–	–	–	–	24	15	9	–
Epidemic Cerebrospinal Meningitis	16	7	2	6	5	–	1	4	1	–	10	8	6	3	3	4	2	1	1	–	3	83	50	33	–
German Measles	222	371	383	496	674	1232	2715	2985	3128	2676	9382	4269	1460	561	339	356	96	43	10	1	1866	33265	15965	17229	71
Gonorrhea	20	3	16	17	15	13	13	13	16	23	47	629	1786	1408	844	857	290	78	16	8	81	6193	4658	1535	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lobar Pneumonia	121	138	108	94	81	92	111	107	90	74	253	227	166	195	226	564	538	462	398	185	140	4370	2601	1763	6
Malaria	–	–	1	–	–	–	–	–	1	–	1	4	3	2	1	3	1	–	–	–	–	17	13	4	–
Measles	257	468	678	776	915	1242	1926	1434	1075	713	1504	429	203	106	86	71	29	6	5	–	429	12352	6224	6104	24
Mumps	19	50	105	157	261	487	877	794	604	436	1055	201	56	74	53	69	26	6	4	2	284	5620	3020	2580	20
Paratyphoid Fever	–	–	–	–	–	–	–	–	–	1	1	–	1	–	–	1	1	–	–	–	–	5	4	1	–
Pellagra	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	3	4	4	3	–	–	17	5	12	–
Scarlet Fever	41	137	351	585	653	761	976	804	646	509	1496	424	204	151	113	125	40	9	2	1	276	8304	4163	4125	16
Septic Sore Throat	–	3	5	6	4	5	7	5	3	4	21	14	22	19	23	30	13	3	5	–	3	195	90	105	–
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	28	2	8	8	10	4	8	7	10	18	72	196	554	661	567	1245	1012	632	199	32	44	5317	3080	2237	–
Trachoma	–	–	–	–	–	–	–	–	–	–	1	2	4	2	4	11	1	5	–	–	1	31	17	14	–
Tuberculosis, Pulmonary	11	7	12	10	8	11	18	15	11	11	111	260	400	443	349	649	511	353	161	37	204	3592	1995	1597	–
Tuberculosis, Other Forms	2	7	9	5	8	8	7	9	5	6	36	28	37	39	25	50	30	25	5	11	35	387	188	199	–
Typhoid Fever	–	–	1	3	1	4	1	3	2	–	12	11	7	10	12	21	11	11	2	–	–	112	72	40	–
Typhus Fever	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	2	1	1	–
Undulant Fever	–	–	–	–	–	–	–	–	–	–	2	2	1	7	2	12	8	8	–	–	–	42	33	9	–
Whooping Cough	415	434	517	623	605	693	806	500	261	171	233	34	6	8	12	12	3	4	3	2	224	5566	2646	2898	22

Index to Line Numbers in the Table of Cases and Deaths from Diseases Dangerous to the Public Health — 1935

Abington	122
Acton	178
Acushnet	144
Adams	65
Agawam	102
Alford	347
Amesbury	77
Amherst	112
Andover	74
Arlington	27
Ashburnham	213
Ashby	283
Ashfield	288
Ashland	184
Athol	72
Attleboro	40
Auburn	110
Avon	196
Ayer	142
Barnstable	87
Barre	153
Becket	297
Bedford	162
Belchertown	143
Bellingham	166
Belmont	32
Berkley	269
Berlin	274
Bernardston	278
Beverly	31
Billerica	105
Blackstone	129
Blandford	314
Bolton	293
Boston	2
Bourne	157
Boxboro	323
Boxford	295
Boylston	253
Braintree	47
Brewster	299
Bridgewater	82
Brimfield	289
Brockton	14
Brookfield	259
Brookline	18
Buckland	244
Burlington	202
Cambridge	5
Canton	109
Carlisle	302
Carver	240
Charlemont	286
Charlton	192
Chatham	212
Chelmsford	94
Chelsea	23
Cheshire	234
Chester	255
Chesterfield	315
Chicopee	25
Chilmark	340
Clarksburg	256
Clinton	66
Cohasset	155
Colrain	241
Concord	91
Conway	281
Cummington	304
Dalton	136
Dana	330
Danvers	60
Dartmouth	80
Dedham	55
Deerfield	169
Dennis	214
Dighton	164
Douglas	190
Dover	258
Dracut	114
Dudley	128
Dunstable	320
Duxbury	197
East Bridgewater	150
East Brookfield	285
East Longmeadow	158
Eastham	305
Easthampton	76
Easton	124
Edgartown	252
Egremont	307
Enfield	312
Erving	262
Essex	248
Everett	21
Fairhaven	68
Fall River	6
Falmouth	106
Fitchburg	24
Florida	322
Foxboro	120
Framingham	36
Franklin	96
Freetown	227
Gardner	43
Gay Head	350
Georgetown	215
Gill	277
Gloucester	35
Goshen	338
Gosnold	353
Grafton	92
Granby	279
Granville	300
Great Barrington	115
Greenfield	51
Greenwich	346
Groton	183
Groveland	201
Hadley	174
Halifax	292
Hamilton	198
Hampden	290
Hancock	325
Hanover	176
Hanson	187
Hardwick	194
Harvard	284
Harwich	193
Hatfield	189
Haverhill	19
Hawley	334
Heath	331
Hingham	98
Hinsdale	270
Holbrook	160
Holden	146
Holland	348
Holliston	171
Holyoke	17
Hopedale	165
Hopkinton	179
Hubbardston	275
Hudson	86
Hull	177
Huntington	254
Ipswich	117
Kingston	173
Lakeville	251
Lancaster	181
Lanesboro	264
Lawrence	11
Lee	139
Leicester	131
Lenox	175
Leominster	39
Leverett	296
Lexington	69
Leyden	341
Lincoln	238
Littleton	245
Longmeadow	126
Lowell	10
Ludlow	84
Lunenburg	206
Lynn	8
Lynnfield	222
Malden	16
Manchester	185
Mansfield	111
Marblehead	78
Marion	223
Marlboro	53
Marshfield	210
Mashpee	329
Mattapoisett	230
Maynard	101
Medfield	140
Medford	15
Medway	161
Melrose	34
Mendon	261
Merrimac	203
Methuen	42
Middleboro	83
Middlefield	345
Middleton	216
Milford	57
Millbury	103
Millis	208
Millville	224
Milton	46
Monroe	343
Monson	125
Montague	88
Monterey	333
Montgomery	349
Mount Washington	355
Nahant	229
Nantucket	154
Natick	59
Needham	67
New Ashford	354
New Bedford	7
New Braintree	317
New Marlboro	287
New Salem	316
Newbury	239
Newburyport	58
Newton	13
Norfolk	207
North Adams	38
North Andover	99
North Attleboro	79
North Brookfield	163
North Reading	195
Northampton	33
Northboro	186
Northbridge	73
Northfield	219
Norton	170
Norwell	233
Norwood	54
Oak Bluffs	231
Oakham	318
Orange	123
Orleans	250
Otis	321
Oxford	137
Palmer	81
Paxton	294
Peabody	37
Pelham	311
Pembroke	235
Pepperell	167
Peru	351
Petersham	298
Phillipston	319
Pittsfield	20
Plainfield	332
Plainville	237
Plymouth	64
Plympton	308
Prescott	356
Princeton	301

Provincetown	141
Quincy	12
Randolph	93
Raynham	200
Reading	71
Rehoboth	172
Revere	30
Richmond	303
Rochester	265
Rockland	89
Rockport	152
Rowe	337
Rowley	247
Royalston	291
Russell	260
Rutland	191
Salem	22
Salisbury	199
Sandisfield	313
Sandwich	246
Saugus	56
Savoy	335
Scituate	145
Seekonk	127
Sharon	149
Sheffield	228
Shelburne	236
Sherborn	276
Shirley	182
Shrewsbury	100
Shutesbury	344
Somerset	121
Somerville	9
South Hadley	104
Southampton	282
Southboro	211
Southbridge	52
Southwick	243
Spencer	113
Springfield	4
Sterling	242
Stockbridge	220
Stoneham	70
Stoughton	85
Stow	267
Sturbridge	221
Sudbury	232
Sunderland	268
Sutton	188
Swampscott	75
Swansea	132
Taunton	28
Templeton	134
Tewksbury	107
Tisbury	226
Tolland	352
Topsfield	273
Townsend	218
Truro	309
Tyngsboro	257
Tyringham	342
Upton	204
Uxbridge	116
Wakefield	50
Wales	328
Walpole	97
Waltham	26
Ware	90
Wareham	118
Warren	151
Warwick	306
Washington	339
Watertown	29
Wayland	156
Webster	61
Wellesley	62
Wellfleet	280
Wendell	327
Wenham	266
West Boylston	205
West Bridgewater	159
West Brookfield	263
West Newbury	249
West Springfield	48
West Stockbridge	271
West Tisbury	336
Westboro	119
Westfield	45
Westford	148
Westhampton	326
Westminster	217
Weston	147
Westport	133
Westwood	180
Weymouth	41
Whately	272
Whitman	95
Wilbraham	168
Williamsburg	225
Williamstown	135
Wilmington	130
Winchendon	108
Winchester	63
Windsor	324
Winthrop	49
Woburn	44
Worcester	3
Worthington	310
Wrentham	138
Yarmouth	209
Tewksbury State Infirmary	357

Cases and Deaths from Diseases

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Population estimated as of July 1, 1935	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		Ep. Cerebrospinal Meningitis		German Measles	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1	Massachusetts	4,361,570	1390	61	10836	9	390	26	10481	–	83	55	33265	6
	CITIES OF OVER 500,000													
2	Boston	821,558	424	13	2635	3	113	7	3115	–	10	8	5352	–
	CITIES OF OVER 150,000													
3	Worcester	190,000	24	2	642	–	8	1	414	–	9	8	704	–
	CITIES OF 100,000–150,000	*796,911*	*312*	*9*	*2139*	*4*	*127*	*9*	*2040*	–	*17*	*13*	*6827*	*1*
4	Springfield	149,615	19	1	570	2	2	–	347	–	1	2	3141	1
5	Cambridge	118,541	65	–	766	–	2	–	647	–	5	3	2052	–
6	Fall River	117,640	114	4	130	–	28	2	158	–	5	2	8	–
7	New Bedford	109,770	8	–	188	–	24	1	81	–	1	2	124	–
8	Lynn	100,770	29	1	320	1	–	–	387	–	2	1	1288	–
9	Somerville	100,465	41	2	117	–	21	2	188	–	3	2	187	–
10	Lowell	100,110	36	1	48	1	50	4	232	–	–	1	27	–
	CITIES AND TOWNS OF 50,000–100,000	*518,461*	*129*	*7*	*962*	*1*	*12*	*2*	*1253*	–	*12*	*7*	*6291*	*3*
11	Lawrence	86,966	12	–	53	–	1	–	193	–	2	2	80	–
12	Quincy	77,427	22	2	150	–	1	1	186	–	1	–	4052	–
13	Newton	66,235	22	–	157	–	1	–	155	–	1	1	1049	1
14	Brockton	62,270	21	2	107	–	2	1	119	–	1	–	86	–
15	Medford	61,626	18	1	193	–	3	–	238	–	2	1	406	–
16	Malden	57,210	26	2	69	1	2	–	205	–	3	1	231	2
17	Holyoke	56,110	3	–	87	–	–	–	79	–	1	1	55	–
18	Brookline	50,617	5	–	146	–	2	–	78	–	1	1	332	–
	CITIES AND TOWNS OF 25,000–50,000	*552,636*	*204*	*11*	*914*	–	*69*	*6*	*1233*	–	*8*	*2*	*2919*	*1*
19	Haverhill	49,600	36	2	138	–	2	–	114	–	–	–	282	–
20	Pittsfield	47,290	3	–	24	–	1	–	56	–	–	–	138	1
21	Everett	47,110	17	1	67	–	4	1	94	–	1	–	83	–
22	Salem	43,485	12	–	18	–	1	–	63	–	2	–	57	–
23	Chelsea	42,342	23	1	48	–	7	–	98	–	1	–	89	–
24	Fitchburg	41,806	12	1	15	–	–	–	30	–	–	–	68	–
25	Chicopee	41,750	–	1	23	–	32	2	36	–	–	–	51	–
26	Waltham	40,695	25	–	103	–	2	–	76	–	–	–	347	–
27	Arlington	38,796	9	–	157	–	2	–	155	–	–	–	445	–
28	Taunton	37,439	5	2	3	–	7	2	12	–	2	1	2	–
29	Watertown	35,923	19	–	42	–	3	–	149	–	–	1	469	–
30	Revere	35,290	18	–	21	–	6	1	137	–	2	–	65	–
31	Beverly	25,954	16	1	17	–	1	–	79	–	–	–	88	–
32	Belmont	25,156	9	2	238	–	1	–	134	–	–	–	735	–
	CITIES AND TOWNS OF 10,000–25,000	*742,840*	*152*	*9*	*1905*	–	*38*	–	*1552*	–	*10*	*4*	*6459*	–
33	Northampton	24,540	1	–	120	–	–	–	54	–	–	–	142	–
34	Melrose	24,370	8	–	20	–	1	–	34	–	1	–	55	–
35	Gloucester	24,160	6	–	6	–	2	–	59	–	1	–	82	–
36	Framingham	22,697	2	–	57	–	2	–	93	–	–	–	140	–
37	Peabody	22,159	4	–	12	–	10	–	29	–	–	–	197	–
38	North Adams	22,134	1	–	6	–	1	–	19	–	–	–	8	–
39	Leominster	21,903	2	–	21	–	1	–	39	–	2	2	113	–
40	Attleboro	21,842	6	1	39	–	–	–	59	–	–	–	7	–
41	Weymouth	21,839	10	–	11	–	1	–	43	–	–	–	15	–
42	Methuen	21,073	8	1	87	–	–	–	33	–	–	–	52	–
43	Gardner	20,502	–	–	27	–	–	–	39	–	–	–	104	–
44	Woburn	19,723	2	–	24	–	1	–	21	–	–	–	18	–
45	Westfield	18,690	–	–	31	–	–	–	32	–	–	–	350	–
46	Milton	18,328	3	4	142	–	–	–	59	–	–	–	773	–
47	Braintree	17,271	5	–	7	–	–	–	24	–	–	–	49	–
48	West Springfield	17,164	–	–	1	–	–	–	1	–	–	–	–	–
49	Winthrop	17,017	5	–	220	–	2	–	74	–	1	–	137	–
50	Wakefield	16,513	3	1	31	–	1	–	74	–	–	–	27	–
51	Greenfield	15,946	4	1	101	–	–	–	25	–	–	–	283	–
52	Southbridge	15,946	1	–	13	–	2	–	9	–	–	–	5	–
53	Marlboro	15,801	2	–	10	–	–	–	3	–	–	–	29	–
54	Norwood	15,629	8	–	4	–	–	–	16	–	1	–	21	–
55	Dedham	15,395	5	–	4	–	–	–	9	–	–	–	9	–
56	Saugus	15,115	3	–	19	–	–	–	33	–	1	–	25	–
57	Milford	15,036	3	–	23	–	–	–	37	–	–	–	31	–
58	Newburyport	14,790	6	–	27	–	–	–	23	–	1	1	209	–
59	Natick	14,479	4	–	111	–	2	–	12	–	–	–	452	–
60	Danvers	13,982	3	–	1	–	3	–	32	–	–	–	39	–
61	Webster	13,926	–	–	35	–	1	–	–	–	–	–	8	–
62	Wellesley	13,580	5	1	181	–	–	–	82	–	–	–	668	–
63	Winchester	13,439	2	–	83	–	–	–	48	–	–	–	104	–
64	Plymouth	13,198	2	–	26	–	–	–	24	–	–	–	115	–
65	Adams	12,875	1	–	25	–	2	–	8	–	–	–	26	–

Dangerous to the Public Health, 1935

Gonorrhea		Lobar Pneumonia		Measles		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		Line No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
6193	7	4370	**1731**	12352	**37**	5620	**3**	1076	–	8304	**57**	5317	**177**	3592	**1813**	387	**148**	112	**10**	5566	**67**	1
2247	**2**	1322	**470**	1253	**2**	1038	–	554	–	1503	**11**	2119	**57**	1116	**506**	108	**47**	19	**4**	817	**8**	2
157	–	269	**79**	98	**2**	398	–	37	–	726	**4**	150	**4**	144	**73**	19	**5**	12	**1**	224	**2**	3
1306	–	*902*	*286*	*5567*	*20*	*1359*	–	*235*	–	*1445*	*5*	*1065*	*45*	*657*	*359*	*83*	*25*	*19*	*3*	*1176*	*21*	
306	–	234	**63**	2489	**9**	762	–	104	–	322	**1**	257	**9**	83	**42**	18	**8**	3	–	320	**2**	4
212	–	164	**48**	140	–	201	–	24	–	198	**2**	232	**7**	130	**61**	20	**1**	1	–	387	**7**	5
199	–	123	**37**	2077	**8**	126	–	70	–	153	–	119	**5**	93	**67**	11	**5**	4	**1**	223	**2**	6
171	–	68	**31**	615	**2**	25	–	22	–	234	**1**	108	**10**	112	**61**	17	**3**	–	–	44	**4**	7
122	–	92	**30**	120	–	102	–	3	–	188	–	142	**7**	76	**42**	8	**1**	5	**1**	70	–	8
130	–	150	**39**	92	**1**	73	–	6	–	191	–	99	**5**	71	**42**	5	**4**	2	–	95	**1**	9
166	–	71	**38**	34	–	70	–	6	–	159	**1**	108	**2**	92	**44**	4	**3**	4	**1**	37	**5**	10
572	*2*	*372*	*165*	*1029*	*2*	*839*	–	*163*	–	*916*	*4*	*479*	*11*	*379*	*190*	*34*	*14*	*8*	–	*830*	*5*	
154	–	37	**28**	13	–	43	–	2	–	48	–	138	**2**	62	**34**	4	**2**	1	–	4	–	11
79	–	41	**27**	129	–	511	–	–	–	272	**1**	50	**2**	83	**40**	7	**3**	3	–	95	**1**	12
48	–	59	**16**	168	–	41	–	4	–	170	**2**	41	**2**	39	**19**	4	**2**	1	–	245	**2**	13
45	–	36	**23**	355	**1**	44	–	138	–	48	–	64	–	46	**19**	4	**1**	–	–	205	–	14
83	–	58	**17**	71	–	108	–	9	–	137	–	49	**2**	40	**16**	7	**3**	–	–	139	–	15
88	**1**	50	**11**	59	–	37	–	7	–	106	–	67	**1**	43	**24**	3	**2**	2	–	58	–	16
30	**1**	52	**22**	182	**1**	8	–	2	–	50	–	20	**2**	42	**28**	3	**1**	1	–	27	**2**	17
45	–	39	**21**	52	–	47	–	1	–	85	**1**	50	–	24	**10**	2	–	–	–	57	–	18
697	–	*539*	*193*	*489*	*2*	*376*	–	*28*	–	*1232*	*9*	*524*	*18*	*441*	*207*	*42*	*21*	*14*	–	*488*	*10*	
193	–	31	**8**	27	–	86	–	9	–	99	–	72	**2**	38	**24**	6	**3**	1	–	110	**1**	19
41	–	21	**10**	12	–	3	–	1	–	132	**4**	40	–	27	**11**	4	**1**	–	–	15	**2**	20
63	–	86	**31**	53	–	46	–	3	–	92	–	68	**3**	41	**20**	2	**1**	1	–	34	–	21
43	–	61	**23**	10	–	10	–	–	–	46	–	30	**2**	28	**14**	1	**1**	1	–	11	–	22
58	–	55	**14**	51	–	12	–	2	–	31	–	71	**4**	46	**19**	6	**3**	2	–	11	**1**	23
22	–	33	**7**	14	–	5	–	4	–	105	–	13	**3**	61	**16**	1	–	–	–	11	**1**	24
45	–	41	**13**	154	**2**	2	–	3	–	369	**3**	27	–	26	**15**	3	**1**	2	–	17	**1**	25
25	–	46	**18**	22	–	46	–	1	–	54	–	19	**1**	51	**11**	4	**4**	2	–	55	–	26
31	–	29	**9**	24	–	29	–	2	–	93	**1**	31	–	28	**13**	1	**2**	1	–	109	–	27
33	–	8	**16**	14	–	2	–	–	–	3	–	27	–	13	**20**	3	**5**	–	–	3	**3**	28
38	–	25	**12**	57	–	37	–	2	–	68	–	31	–	36	**12**	7	–	2	–	33	–	29
42	–	27	**6**	9	–	10	–	–	–	83	–	47	**3**	25	**16**	3	–	2	–	13	–	30
43	–	55	**18**	10	–	61	–	1	–	31	–	20	–	8	**10**	–	–	–	–	11	**1**	31
20	–	21	**8**	32	–	27	–	–	–	26	**1**	28	–	13	**6**	1	–	–	–	55	–	32
679	*2*	*561*	*257*	*1312*	*1*	*743*	*1*	*38*	–	*1250*	*11*	*495*	*18*	*402*	*219*	*49*	*18*	15	–	*1102*	*10*	
47	–	37	**9**	99	–	97	–	1	–	49	–	26	–	16	**6**	4	–	–	–	4	–	33
20	–	45	**12**	11	–	6	–	7	–	22	–	18	–	10	**7**	3	–	–	–	5	–	34
19	–	16	**13**	12	–	1	–	3	–	6	–	23	**1**	13	**12**	–	**1**	2	–	13	**1**	35
24	–	29	**9**	27	–	32	–	2	–	28	–	20	–	13	**7**	3	–	1	–	109	–	36
21	–	10	**12**	12	–	7	–	–	–	75	–	25	–	15	**11**	4	**1**	–	–	5	**1**	37
11	–	12	**6**	117	–	5	–	1	–	4	**1**	13	–	5	**4**	1	–	–	–	36	–	38
5	–	26	**8**	16	–	1	–	–	–	42	–	14	**1**	15	**3**	2	–	1	–	34	–	39
19	–	13	**7**	109	–	3	–	–	–	6	–	13	**1**	7	**6**	2	–	–	–	33	–	40
30	–	10	**10**	30	–	17	–	–	–	53	–	17	**2**	17	**5**	–	–	1	–	–	–	41
22	–	7	**6**	8	–	76	–	–	–	40	–	19	–	7	**3**	2	–	–	–	34	–	42
22	–	22	**10**	7	**1**	3	–	–	–	27	**1**	6	**1**	13	**7**	2	–	1	–	35	–	43
13	–	11	**10**	17	–	–	–	–	–	10	–	11	–	8	**9**	1	–	–	–	4	–	44
8	–	26	**5**	79	–	48	–	1	–	10	–	17	**1**	9	**9**	1	**1**	–	–	17	–	45
7	–	8	**4**	17	–	46	–	–	–	33	–	2	–	5	**4**	1	–	1	–	60	–	46
22	–	2	**7**	7	–	32	–	1	–	21	**3**	8	–	3	**2**	–	–	–	–	1	–	47
24	–	12	**7**	2	–	1	–	–	–	25	–	13	–	6	**3**	–	–	1	–	2	**2**	48
8	–	19	**5**	37	–	8	–	1	–	20	–	11	**2**	11	**8**	1	**1**	–	–	55	–	49
15	–	9	**2**	5	–	–	–	–	–	3	–	22	–	13	**4**	1	–	1	–	23	**2**	50
15	**1**	7	**5**	201	–	27	–	2	–	15	–	15	–	9	**1**	–	–	–	–	10	–	51
12	–	9	**4**	9	–	–	–	2	–	20	–	4	–	7	**4**	–	–	–	–	1	–	52
24	–	8	**5**	7	–	2	–	–	–	24	–	26	–	6	**2**	1	**1**	–	–	28	–	53
8	–	10	**1**	6	–	13	**1**	3	–	10	–	7	–	10	**9**	3	**1**	–	–	2	–	54
15	–	9	**6**	–	–	1	–	–	–	13	–	8	**2**	8	**4**	1	**1**	1	–	–	–	55
14	–	6	**4**	16	–	18	–	–	–	22	–	8	–	7	**5**	–	–	–	–	3	–	56
34	–	12	**5**	5	–	6	–	–	–	10	–	13	–	9	**8**	3	**1**	–	–	21	**2**	57
24	–	8	**3**	1	–	2	–	–	–	11	–	8	–	4	**3**	1	–	1	–	46	**1**	58
15	–	12	**5**	29	–	18	–	–	–	81	–	5	–	9	**3**	1	**1**	–	–	85	–	59
12	–	7	**3**	2	–	–	–	–	–	15	–	4	–	5	**1**	–	–	–	–	19	–	60
5	**1**	10	**5**	2	–	1	–	3	–	4	–	2	–	3	**4**	2	**1**	–	–	–	–	61
7	–	4	**1**	24	–	15	–	–	–	13	–	9	–	1	**5**	–	**1**	–	–	96	–	62
14	–	12	**1**	19	–	1	–	–	–	33	–	12	–	3	**7**	1	–	–	–	20	–	63
19	–	6	**1**	14	–	6	–	–	–	43	–	15	–	8	**4**	1	–	–	–	61	**1**	64
6	–	9	**4**	85	–	–	–	–	–	15	–	2	–	3	**5**	1	–	–	–	17	–	65

Cases and Deaths from Diseases

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1935	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		Ep. Cerebrospinal Meningitis		German Measles	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
66	Clinton	12,330	–	–	11	–	–	–	22	–	–	–	11	–
67	Needham	11,931	1	–	67	–	–	–	79	–	–	–	799	–
68	Fairhaven	11,010	–	–	38	–	3	–	26	–	–	1	7	–
69	Lexington	10,955	6	–	17	–	–	–	25	–	–	–	222	–
70	Stoneham	10,923	1	–	27	–	–	–	42	–	–	–	24	–
71	Reading	10,801	4	–	8	–	–	–	12	–	–	–	19	–
72	Athol	10,759	–	–	1	–	1	–	6	–	–	–	8	–
73	Northbridge	10,668	3	–	4	–	1	–	3	–	2	–	6	–
74	Andover	10,603	7	–	131	–	–	–	36	–	–	–	280	–
75	Swampscott	10,494	4	–	40	–	1	–	55	–	–	–	242	–
76	Easthampton	10,400	–	–	–	–	–	–	12	–	–	–	12	–
77	Amesbury	10,370	5	–	5	–	–	–	21	–	–	–	477	–
78	Marblehead	10,331	2	–	31	–	–	–	60	–	–	–	56	–
79	North Attleboro	10,203	4	–	–	–	–	–	1	–	–	–	3	–
80														
81	TOWNS OF 5,000–10,000	*337,936*	*77*	*6*	*725*	*1*	*7*	–	*418*	–	*10*	*4*	*1860*	–
82	Dartmouth	9,492	1	–	3	–	–	–	19	–	–	–	6	–
83	Palmer	9,425	–	–	49	–	–	–	2	–	–	–	28	–
84	Bridgewater	9,217	–	–	16	–	–	–	21	–	–	–	19	–
85	Middleboro	8,892	–	–	112	–	–	–	6	–	–	–	43	–
86	Ludlow	8,540	1	–	2	–	–	–	2	–	1	1	11	–
87	Stoughton	8,507	3	–	9	–	–	–	8	–	–	–	30	–
88	Hudson	8,497	2	–	–	–	–	–	1	–	–	–	8	–
89	Barnstable	8,118	–	–	33	1	–	–	19	–	–	–	47	–
90	Montague	7,955	1	–	9	–	–	–	4	–	–	–	57	–
91	Rockland	7,928	–	–	–	–	–	–	–	–	–	–	–	–
92	Ware	7,763	–	–	–	–	–	–	–	–	–	–	–	–
93	Concord	7,749	4	1	32	–	–	–	9	–	–	–	390	–
94	Grafton	7,749	–	–	–	–	–	–	1	–	–	–	–	–
95	Randolph	7,688	1	–	–	–	–	–	–	–	–	–	–	–
96	Chelmsford	7,655	2	–	19	–	–	–	18	–	–	–	13	–
97	Whitman	7,586	–	–	1	–	1	–	1	–	–	–	–	–
98	Franklin	7,543	4	–	9	–	–	–	28	–	2	–	13	–
99	Walpole	7,468	4	–	2	–	–	–	6	–	–	–	5	–
100	Hingham	7,400	–	–	37	–	–	–	33	–	–	–	51	–
101	North Andover	7,186	7	1	14	–	–	–	25	–	–	–	199	–
102	Shrewsbury	7,168	3	–	9	–	–	–	–	–	3	2	3	–
103	Maynard	7,105	2	–	4	–	–	–	3	–	–	–	13	–
104	Agawam	7,016	–	–	2	–	–	–	–	–	–	–	10	–
105	Millbury	6,871	1	1	22	–	–	–	22	–	–	–	51	–
106	South Hadley	6,844	1	–	–	–	–	–	12	–	–	–	–	–
107	Billerica	6,731	5	–	–	–	1	–	4	–	–	–	–	–
108	Falmouth	6,718	1	–	12	–	–	–	38	–	–	–	17	–
109	Tewksbury	6,666	–	–	1	–	–	–	7	–	–	–	–	–
110	Winchendon	6,646	–	–	20	–	–	–	1	–	–	–	79	–
111	Canton	6,578	1	–	28	–	1	–	23	–	–	–	15	–
112	Auburn	6,576	–	–	33	–	1	–	2	–	–	–	48	–
113	Mansfield	6,562	–	–	8	–	–	–	10	–	–	–	1	–
114	Amherst	6,535	–	–	12	–	–	–	11	–	1	–	140	–
115	Spencer	6,510	–	–	32	–	–	–	9	–	1	–	4	–
116	Dracut	6,460	5	1	–	–	–	–	3	–	–	–	–	–
117	Great Barrington	6,415	–	–	32	–	–	–	15	–	–	–	393	–
118	Uxbridge	6,409	4	–	89	–	1	–	8	–	1	–	3	–
119	Ipswich	6,282	3	–	2	–	–	–	8	–	–	–	14	–
120	Wareham	6,085	5	–	26	–	–	–	6	–	–	–	19	–
121	Westboro	6,040	2	–	–	–	1	–	5	–	–	–	1	–
122	Foxboro	5,885	–	–	19	–	–	–	6	–	–	–	3	–
123	Somerset	5,683	10	2	–	–	–	–	–	–	–	–	–	–
124	Abington	5,680	1	–	–	–	–	–	–	–	–	–	–	–
125	Orange	5,385	–	–	2	–	1	–	1	–	–	–	2	–
126	Easton	5,294	–	–	7	–	–	–	8	–	–	–	2	–
127	Monson	5,222	–	–	–	–	–	–	1	–	–	–	–	–
	Longmeadow	5,175	3	–	18	–	–	–	11	–	1	1	121	–
	Seekonk	5,037	–	–	–	–	–	–	1	–	–	–	1	–
	TOWNS OF 2,500–5,000	*200,815*	*44*	*3*	*472*	–	*4*	*1*	*239*	–	*3*	*5*	*1626*	–
128	Dudley	4,600	–	–	–	–	–	–	1	–	–	–	–	–
129	Blackstone	4,580	1	–	–	–	–	–	–	–	–	–	–	–
130	Wilmington	4,543	1	–	–	–	–	–	19	–	–	–	8	–
131	Leicester	4,425	1	1	–	–	–	–	–	–	–	–	–	–
132	Swansea	4,368	2	–	–	–	–	–	–	–	–	–	–	–
133	Westport	4,350	6	1	20	–	–	–	5	–	–	–	10	–
134	Templeton	4,317	1	–	–	–	–	–	–	–	–	–	–	–
135	Williamstown	4,311	–	–	1	–	–	–	–	–	–	–	179	–
136	Dalton	4,288	1	–	–	–	–	–	–	–	–	–	–	–
137	Oxford	4,281	–	–	9	–	–	–	–	–	–	–	11	
138	Wrentham	4,221	–	–	36	–	–	–	7	–	–	–	210	–

Dangerous to the Public Health, 1935—Continued

Gonorrhea		Lobar Pneumonia		Measles		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
1	–	13	5	4	–	–	–	–	–	7	1	3	–	11	5	1	–	–	–	–	–	66
11	–	10	5	6	–	5	–	1	–	56	–	7	–	9	2	–	1	–	–	29	–	67
8	–	3	3	102	–	38	–	4	–	23	–	4	1	9	5	–	–	–	–	26	–	68
14	–	16	6	46	–	1	–	–	–	99	2	5	–	37	1	–	–	1	–	9	–	69
12	–	7	6	9	–	2	–	–	–	15	–	8	1	5	6	–	–	–	–	4	–	70
9	–	9	5	1	–	1	–	–	–	39	–	2	–	11	5	–	–	–	–	1	–	71
10	–	11	7	21	–	–	–	–	–	3	–	–	1	12	4	1	–	–	–	–	–	72
5	–	12	4	–	–	–	–	–	–	65	1	6	–	4	2	–	–	–	–	–	–	73
10	–	2	1	5	–	16	–	–	–	33	–	6	–	3	–	2	1	–	–	3	–	74
5	–	8	4	6	–	16	–	5	–	23	–	9	–	4	2	1	1	3	–	7	–	75
7	–	8	6	38	–	116	–	–	–	18	1	9	–	9	3	–	2	–	–	–	–	76
11	–	11	5	12	–	53	–	–	–	30	1	5	2	5	2	1	–	–	–	143	–	77
11	–	6	5	17	–	2	–	–	–	34	–	8	1	2	4	–	1	–	–	1	–	78
4	–	2	–	13	–	–	–	1	–	2	–	7	1	3	3	–	1	–	–	–	–	79
256	*1*	*168*	*103*	*1091*	*3*	*465*	*1*	*8*	–	*659*	*6*	*239*	*12*	*213*	*91*	*21*	*8*	*14*	–	*461*	*5*	
4	–	10	6	110	–	1	–	2	–	9	–	7	–	13	6	2	1	–	–	17	–	80
5	–	5	1	36	–	9	–	–	–	9	–	11	1	3	3	–	–	2	–	1	–	81
11	–	13	6	69	–	2	–	–	–	4	1	3	1	14	5	1	1	–	–	65	–	82
5	–	8	3	35	–	2	–	–	–	9	–	9	–	–	2	–	–	1	–	2	–	83
7	–	1	3	36	–	47	–	–	–	9	–	5	–	9	6	1	–	–	–	7	–	84
10	1	2	1	65	–	13	–	1	–	17	–	5	–	22	5	2	1	–	–	1	–	85
2	–	–	1	–	–	–	–	–	–	16	–	7	–	–	3	1	1	–	–	–	–	86
14	–	2	5	5	1	–	–	–	–	3	–	7	–	5	3	1	–	–	–	19	1	87
2	–	–	4	47	1	–	–	–	–	2	–	5	–	3	1	–	–	1	–	3	–	88
12	–	–	–	–	–	–	–	–	–	1	–	6	–	3	3	–	–	–	–	–	–	89
3	–	–	4	2	–	1	–	–	–	5	1	8	–	1	2	–	1	–	–	–	–	90
6	–	4	1	166	–	14	–	–	–	40	–	6	–	2	4	–	–	–	–	7	–	91
2	–	2	3	–	–	–	–	–	–	1	–	2	1	–	1	–	–	–	–	–	–	92
12	–	–	–	2	–	–	–	–	–	4	–	13	–	3	2	1	–	1	–	1	–	93
3	–	5	–	9	–	18	–	–	–	14	1	1	–	5	1	–	2	1	–	17	–	94
5	–	3	5	4	–	–	1	–	–	–	–	3	–	7	2	–	–	1	–	–	–	95
1	–	1	1	13	–	1	–	–	–	48	–	4	1	3	1	–	–	–	–	–	–	96
5	–	7	3	3	–	5	–	–	–	–	–	–	–	5	1	–	–	1	–	14	1	97
5	–	6	1	125	–	27	–	1	–	12	–	12	1	7	2	1	–	–	–	6	–	98
1	–	5	4	1	–	55	–	–	–	3	–	1	–	5	3	2	–	1	–	1	–	99
2	–	7	2	–	–	3	–	–	–	7	–	3	–	1	2	–	–	–	–	5	–	100
2	–	5	5	3	–	2	–	–	–	14	–	–	–	6	3	–	–	–	–	2	1	101
7	–	4	1	5	1	–	–	–	–	108	–	1	–	–	–	–	–	1	–	–	–	102
3	–	4	1	7	–	–	–	–	–	52	1	–	–	5	1	–	–	–	–	45	–	103
1	–	2	–	1	–	–	–	–	–	5	–	–	1	2	2	–	–	–	–	–	–	104
3	–	5	4	6	–	6	–	–	–	4	1	9	–	1	–	–	–	–	–	–	–	105
16	–	7	1	36	–	11	–	1	–	7	–	23	1	15	3	–	–	–	–	39	–	106
5	–	3	4	1	–	2	–	–	–	–	–	12	–	1	2	–	–	–	–	–	–	107
14	–	4	5	2	–	–	–	1	–	4	–	–	–	3	–	1	–	–	–	71	–	108
2	–	1	1	49	–	25	–	–	–	6	–	4	–	2	1	1	–	–	–	2	–	109
5	–	8	–	4	–	3	–	–	–	19	–	2	–	1	1	1	–	1	–	29	–	110
5	–	3	1	4	–	–	–	1	–	9	–	2	–	1	1	1	–	1	–	2	–	111
13	–	4	3	14	–	21	–	–	–	16	–	6	2	7	2	1	–	1	–	3	–	112
5	–	2	1	15	–	–	–	–	–	44	1	3	–	6	1	1	–	–	–	6	–	113
3	–	–	1	–	–	–	–	–	–	2	–	2	–	1	2	–	–	1	–	–	–	114
12	–	5	1	91	–	177	–	–	–	9	–	1	–	3	–	–	–	–	–	14	–	115
2	–	3	2	9	–	–	–	–	–	18	–	4	–	7	1	1	–	–	–	–	–	116
2	–	1	1	2	–	–	–	–	–	42	–	–	1	4	1	1	–	–	–	–	–	117
16	–	1	1	66	–	3	–	–	–	33	–	18	1	8	3	1	–	–	–	42	–	118
5	–	6	1	–	–	–	–	–	–	1	–	4	–	3	1	–	–	–	–	–	–	119
1	–	9	1	5	–	8	–	–	–	15	–	4	–	16	1	–	–	–	–	5	1	120
3	–	–	2	–	–	–	–	1	–	–	–	5	–	2	2	–	–	–	–	9	1	121
–	–	1	3	–	–	–	–	–	–	13	–	4	–	2	1	–	–	–	–	–	–	122
2	–	–	1	3	–	–	–	–	–	5	–	3	–	1	1	–	–	–	–	4	–	123
3	–	8	4	4	–	1	–	–	–	11	–	7	1	3	1	–	–	–	–	8	–	124
2	–	–	1	–	–	–	–	–	–	4	–	2	–	–	–	–	1	–	–	–	–	125
3	–	1	1	36	–	7	–	–	–	4	–	1	–	1	1	–	–	–	–	14	–	126
4	–	–	2	–	–	1	–	–	–	1	–	4	–	1	1	–	–	–	–	–	–	127
112	–	*104*	*83*	*950*	*2*	*198*	*1*	*9*	–	*300*	*4*	*124*	*6*	*77*	*80*	*11*	*6*	*6*	–	*174*	*3*	
1	–	–	–	–	–	–	–	–	–	3	–	2	–	1	1	–	–	–	–	–	–	128
–	–	–	2	–	–	–	–	–	–	–	–	2	–	–	3	–	–	–	–	–	–	129
5	–	3	1	1	–	7	–	–	–	1	1	5	–	2	2	–	–	–	–	18	–	130
–	–	2	1	–	–	–	–	–	–	4	–	–	–	1	1	1	–	–	–	–	–	131
3	–	–	6	–	–	–	–	–	–	–	–	–	–	1	3	–	–	–	–	–	–	132
2	–	1	–	18	–	–	–	1	–	–	–	3	–	1	2	–	–	4	–	1	–	133
7	–	–	2	1	1	–	–	–	–	–	–	2	–	–	1	1	–	–	–	–	–	134
3	–	6	2	290	–	–	–	–	–	10	–	9	–	1	–	–	–	–	–	–	–	135
5	–	1	1	–	–	–	–	–	–	3	–	1	–	–	1	–	–	–	–	–	–	136
–	–	1	2	4	–	–	–	–	–	5	–	1	–	1	1	–	2	–	–	1	1	137
2	–	13	4	1	–	2	–	–	–	1	–	1	–	13	2	–	–	–	–	–	–	138

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1935	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		Ep. Cerebrospinal Meningitis		German Measles	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
139	Lee	4,190	–	–	1	–	–	–	6	–	–	–	8	–
140	Medfield	4,172	3	–	–	–	–	–	2	–	–	–	6	–
141	Provincetown	4,099	–	–	25	–	–	–	8	–	–	–	–	–
142	Ayer	3,946	–	–	18	–	–	–	5	–	–	–	37	–
143	Belchertown	3,939	–	–	11	–	–	–	1	–	1	1	21	–
144	Acushnet	3,936	–	–	1	–	–	–	–	–	–	–	–	–
145	Scituate	3,923	6	1	10	–	–	–	4	–	–	–	17	–
146	Holden	3,918	–	–	82	–	–	–	5	–	–	–	63	–
147	Weston	3,902	–	–	8	–	–	–	21	–	–	–	101	–
148	Westford	3,809	1	–	11	–	–	–	7	–	–	–	80	–
149	Sharon	3,718	–	–	29	–	–	–	15	–	–	–	20	–
150	East Bridgewater	3,678	2	–	–	–	–	–	–	–	–	–	3	–
151	Warren	3,651	–	–	1	–	–	–	–	–	–	–	–	–
152	Rockport	3,634	–	–	–	–	–	–	19	–	–	–	11	–
153	Barre	3,509	–	–	1	–	–	–	–	–	–	–	36	–
154	Nantucket	3,480	–	–	3	–	–	–	6	–	–	1	–	–
155	Cohasset	3,453	–	–	3	–	–	–	7	–	–	–	8	–
156	Wayland	3,389	–	–	–	–	–	–	8	–	–	–	2	–
157	Bourne	3,382	–	–	–	–	1	–	–	–	–	–	–	–
158	East Longmeadow	3,380	–	–	60	–	–	–	4	–	–	–	112	–
159	West Bridgewater	3,372	–	–	1	–	–	–	3	–	1	1	3	–
160	Holbrook	3,365	–	–	6	–	–	–	12	–	–	–	13	–
161	Medway	3,280	2	–	–	–	–	–	9	–	–	–	16	–
162	Bedford	3,246	–	–	5	–	–	–	7	–	–	–	146	–
163	North Brookfield	3,204	–	–	–	–	–	–	–	–	–	–	–	–
164	Dighton	3,113	3	–	1	–	1	–	–	–	–	1	–	–
165	Hopedale	3,078	–	–	3	–	–	–	1	–	–	–	15	–
166	Bellingham	3,043	–	–	–	–	–	–	1	–	–	–	1	–
167	Pepperell	3,012	–	–	5	–	–	–	3	–	–	–	6	–
168	Wilbraham	2,995	–	–	79	–	–	–	3	–	–	–	59	–
169	Deerfield	2,971	–	–	–	–	–	–	1	–	1	–	12	–
170	Norton	2,945	6	–	5	–	–	–	3	–	–	–	–	–
171	Holliston	2,931	–	–	1	–	–	–	8	–	–	1	–	–
172	Rehoboth	2,794	–	–	–	–	–	–	–	–	–	–	–	–
173	Kingston	2,750	–	–	–	–	–	–	–	–	–	–	–	–
174	Hadley	2,714	–	–	–	–	–	–	–	–	–	–	–	–
175	Lenox	2,705	1	–	–	–	–	–	1	–	–	–	–	–
176	Hanover	2,700	–	–	2	–	–	–	6	–	–	–	128	–
177	Hull	2,679	–	–	–	–	–	–	–	–	–	–	–	–
178	Acton	2,651	–	–	1	–	–	–	1	–	–	–	29	–
179	Hopkinton	2,621	1	–	12	–	–	–	14	–	–	–	7	–
180	Westwood	2,583	–	–	–	–	–	–	–	–	–	–	–	–
181	Lancaster	2,560	–	–	7	–	1	–	9	–	–	–	52	–
182	Shirley	2,560	–	–	12	–	1	1	7	–	–	–	141	–
183	Groton	2,544	1	–	2	–	–	–	–	–	–	–	54	–
184	Ashland	2,507	1	–	–	–	–	–	–	–	–	–	–	–
185	Manchester	2,500	4	–	–	–	–	–	–	–	–	–	1	–
	Towns of 1,000–2,500	*158,315*	*18*	–	*293*	–	*9*	–	*182*	–	*4*	*4*	*714*	*1*
186	Northboro	2,443	–	–	–	–	–	–	4	–	–	–	–	–
187	Hanson	2,442	–	–	2	–	–	–	1	–	–	–	2	–
188	Sutton	2,436	–	–	1	–	1	–	3	–	–	–	–	–
189	Hatfield	2,430	–	–	1	–	–	–	2	–	–	–	3	–
190	Douglas	2,425	–	–	2	–	–	–	–	–	–	–	2	–
191	Rutland	2,403	–	–	2	–	–	–	–	–	–	–	17	–
192	Charlton	2,388	–	–	1	–	–	–	–	–	–	–	–	–
193	Harwich	2,378	–	–	–	–	–	–	2	–	–	–	–	–
194	Hardwick	2,371	2	–	6	–	–	–	–	–	–	–	3	–
195	North Reading	2,361	2	–	–	–	–	–	1	–	–	–	5	–
196	Avon	2,357	1	–	3	–	1	–	6	–	1	1	–	–
197	Duxbury	2,301	–	–	2	–	–	–	–	–	1	1	–	–
198	Hamilton	2,255	1	–	5	–	–	–	2	–	–	–	7	–
199	Salisbury	2,250	–	–	1	–	–	–	18	–	–	–	21	–
200	Raynham	2,215	–	–	–	–	–	–	–	–	–	1	–	–
201	Groveland	2,207	1	–	–	–	–	–	–	–	–	–	1	–
202	Burlington	2,190	–	–	4	–	–	–	1	–	–	–	1	–
203	Merrimac	2,190	–	–	–	–	–	–	5	–	–	–	7	–
204	Upton	2,177	–	–	23	–	–	–	12	–	–	–	8	–
205	West Boylston	2,163	1	–	22	–	–	–	–	–	–	–	35	–
206	Lunenburg	2,143	–	–	4	–	–	–	5	–	–	–	48	–
207	Norfolk	2,141	1	–	–	–	–	–	4	–	–	–	–	–
208	Millis	2,136	1	–	–	–	–	–	–	–	–	–	–	–
209	Yarmouth	2,127	–	–	–	–	–	–	8	–	–	–	6	–
210	Marshfield	2,120	–	–	10	–	–	–	11	–	–	–	21	–
211	Southboro	2,103	–	–	31	–	–	–	4	–	–	–	–	–
212	Chatham	2,063	–	–	–	–	2	–	–	–	–	–	13	–
213	Ashburnham	2,048	–	–	1	–	–	–	2	–	–	–	36	–

Dangerous to the Public Health, 1935—Continued

Gonorrhea		Lobar Pneumonia		Measles		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		Line No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
2	–	–	1	62	1	–	–	–	–	14	1	6	–	1	2	–	–	–	–	–	–	139
1	–	5	1	–	–	–	–	–	–	2	–	1	1	2	3	–	–	–	–	–	–	140
2	–	3	3	–	–	–	–	–	–	10	–	4	–	1	4	–	–	–	–	–	–	141
2	–	3	3	9	–	–	–	–	–	5	–	2	–	2	1	1	–	–	–	2	–	142
2	–	3	2	10	–	10	–	–	–	5	–	2	–	1	5	–	–	–	–	–	–	143
3	–	–	–	3	–	–	–	–	–	11	–	2	–	2	4	1	–	–	–	–	–	144
1	–	2	–	8	–	3	–	–	–	1	–	7	–	1	1	–	–	–	–	3	–	145
1	–	–	2	1	–	–	–	5	–	6	–	1	–	2	2	–	–	1	–	17	–	146
1	–	4	2	16	–	6	–	–	–	–	–	2	–	–	2	–	1	–	–	32	1	147
2	–	–	3	–	–	4	1	–	–	2	–	1	–	3	–	–	–	–	–	9	–	148
2	–	1	5	6	–	7	–	1	–	31	–	2	–	1	5	–	–	–	–	–	–	149
4	–	4	4	14	–	–	–	1	–	7	–	5	–	1	–	–	–	–	–	14	–	150
2	–	1	–	–	–	–	–	–	–	5	–	2	–	–	1	1	–	–	–	2	–	151
1	–	4	2	1	–	42	–	1	–	–	–	1	–	1	2	1	2	1	–	9	–	152
–	–	–	2	62	–	22	–	–	–	8	–	–	1	1	2	–	–	–	–	10	–	153
3	–	–	–	57	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	5	1	154
7	–	2	2	113	–	22	–	–	–	3	–	3	–	2	1	–	–	–	–	–	–	155
2	–	1	2	–	–	–	–	–	–	3	–	5	–	1	–	–	–	–	–	–	–	156
5	–	2	4	–	–	–	–	–	–	1	–	–	–	–	3	–	–	–	–	–	–	157
1	–	3	1	115	–	17	–	–	–	4	–	2	–	3	1	–	–	–	–	4	–	158
1	–	1	–	8	–	18	–	–	–	1	–	3	–	1	–	–	–	–	–	–	–	159
4	–	2	–	5	–	–	–	–	–	–	–	2	–	2	3	4	1	–	–	1	–	160
–	–	–	–	6	–	–	–	–	–	1	–	4	–	2	–	1	–	–	–	–	–	161
2	–	15	2	–	–	1	–	–	–	26	–	2	–	–	–	–	–	–	–	2	–	162
–	–	–	1	16	–	–	–	–	–	5	–	1	–	1	1	–	–	–	–	1	–	163
1	–	–	1	44	–	–	–	–	–	1	–	1	–	2	3	–	–	–	–	–	–	164
3	–	5	4	1	–	1	–	–	–	8	–	–	–	1	–	–	–	–	–	3	–	165
–	–	–	1	–	–	–	–	–	–	–	–	3	–	2	–	–	–	–	–	–	–	166
1	–	–	1	1	–	–	–	–	–	21	–	1	–	1	1	–	–	–	–	7	–	167
2	–	1	1	11	–	24	–	–	–	3	–	3	–	1	–	–	–	–	–	1	–	168
–	–	2	1	3	–	–	–	–	–	8	–	–	1	–	–	–	–	–	–	–	–	169
7	–	1	3	2	–	2	–	–	–	–	–	8	–	3	1	–	–	–	–	–	–	170
–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	171
1	–	–	2	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	172
3	–	–	1	–	–	–	–	–	–	–	–	1	–	2	3	–	–	–	–	–	–	173
1	–	1	2	–	–	–	–	–	–	1	–	2	1	–	–	–	–	–	–	–	–	174
1	–	–	–	3	–	–	–	–	–	13	–	–	–	3	1	–	–	–	–	–	–	175
–	–	–	–	–	–	1	–	–	–	1	–	1	–	1	3	–	–	–	–	–	–	176
3	–	–	–	38	–	–	–	–	–	11	–	2	–	3	–	–	–	–	–	–	–	177
2	–	1	–	16	–	–	–	–	–	4	–	2	–	1	1	–	–	–	–	8	–	178
1	–	–	–	–	–	7	–	–	–	3	–	–	–	1	–	–	–	–	–	–	–	179
–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	180
6	–	4	–	2	–	2	–	–	–	–	–	6	–	1	1	–	–	–	–	3	–	181
–	–	2	1	1	–	–	–	–	–	42	2	–	–	1	3	–	–	–	–	2	–	182
–	–	–	1	–	–	–	–	–	–	3	–	3	–	1	1	–	–	–	–	19	–	183
–	–	–	–	–	–	–	–	–	–	1	–	1	1	–	–	–	–	–	–	–	–	184
1	–	3	–	1	–	–	–	–	–	–	–	2	1	–	–	–	–	–	–	–	–	185
140	–	*78*	*75*	*279*	*2*	*191*	–	*2*	–	*195*	*1*	*97*	*4*	*77*	*68*	*13*	*3*	*2*	*1*	*261*	*1*	
4	–	1	1	2	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	186
3	–	–	1	1	–	–	–	–	–	1	–	6	–	4	2	–	–	1	–	–	–	187
3	–	5	2	1	–	–	–	–	–	18	–	2	–	2	–	–	–	–	–	1	–	188
1	–	2	–	–	–	–	–	–	–	3	–	–	–	2	1	–	–	–	–	–	–	189
2	–	–	2	5	–	–	–	–	–	3	–	–	1	–	2	1	–	–	–	–	–	190
1	–	–	–	–	–	–	–	–	–	1	–	–	–	4	5	1	–	–	–	–	–	191
4	–	6	1	1	–	–	–	–	–	3	–	–	–	–	–	1	1	–	–	–	–	192
11	–	–	–	–	–	–	–	–	–	–	–	3	–	–	3	–	–	–	–	–	–	193
1	–	–	1	2	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	14	–	194
2	–	2	4	1	–	–	–	–	–	25	–	–	–	1	1	–	–	–	–	2	–	195
1	–	–	–	71	–	2	–	–	–	1	–	3	–	1	–	–	–	–	–	4	–	196
3	–	–	1	–	–	–	–	–	–	–	–	2	–	1	1	1	–	–	–	6	–	197
–	–	3	2	–	–	8	–	–	–	–	–	1	–	1	–	–	1	–	–	–	–	198
7	–	–	1	1	–	4	–	–	–	2	–	–	–	1	–	–	–	–	–	24	–	199
–	–	–	–	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	200
4	–	–	1	–	–	18	–	–	–	6	–	5	–	2	1	–	–	–	–	–	–	201
3	–	–	–	1	–	–	–	–	–	3	–	2	–	1	1	–	–	–	–	1	–	202
2	–	7	5	–	–	–	–	–	–	2	–	4	–	1	2	–	–	–	–	2	–	203
1	–	4	1	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	4	–	204
–	–	–	1	–	–	–	–	–	–	2	–	–	–	2	–	–	–	–	–	6	–	205
–	–	–	1	3	–	3	–	–	–	15	–	–	–	–	1	–	–	–	–	–	–	206
1	–	1	–	1	–	–	–	–	–	–	–	1	–	11	5	3	–	–	–	–	–	207
–	–	2	1	–	–	–	–	–	–	3	–	1	1	1	1	–	–	–	–	–	–	208
1	–	–	1	–	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	209
3	–	1	1	2	–	1	–	–	–	–	–	7	–	–	1	–	–	–	–	69	–	210
2	–	–	1	–	–	56	–	–	–	1	–	–	–	1	–	1	–	–	–	3	–	211
8	–	–	–	–	–	1	–	–	–	–	–	–	–	4	1	–	–	–	–	–	–	212
1	–	2	2	–	–	–	–	–	–	18	1	–	–	1	2	–	–	–	–	–	–	213

Cases and Deaths from Diseases

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1935	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		Ep. Cerebrospinal Meningitis		German Measles	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
214	Dennis	2,037	1	–	–	–	–	–	5	–	–	–	2	–
215	Georgetown	2,025	–	–	–	–	–	–	6	–	–	–	37	–
216	Middleton	2,002	2	–	–	–	–	–	1	–	–	–	–	–
217	Westminster	1,969	1	–	–	–	–	–	–	–	–	–	8	–
218	Townsend	1,962	–	–	3	–	–	–	–	–	–	–	–	–
219	Northfield	1,957	–	–	1	–	–	–	2	–	–	–	62	–
220	Stockbridge	1,938	–	–	–	–	–	–	8	–	1	–	21	–
221	Sturbridge	1,934	–	–	–	–	–	–	–	–	–	–	–	–
222	Lynnfield	1,928	–	–	3	–	–	–	6	–	–	–	17	–
223	Marion	1,891	–	–	8	–	–	–	6	–	–	–	26	–
224	Millville	1,880	–	–	–	–	–	–	1	–	–	–	–	–
225	Williamsburg	1,856	–	–	–	–	–	–	7	–	–	–	3	–
226	Tisbury	1,851	–	–	–	–	–	–	–	–	–	–	–	–
227	Freetown	1,830	–	–	–	–	–	–	–	–	–	–	–	–
228	Sheffield	1,827	–	–	15	–	–	–	–	–	–	–	28	–
229	Nahant	1,757	–	–	–	–	–	–	–	–	–	–	8	–
230	Mattapoisett	1,701	–	–	–	–	–	–	3	–	–	–	1	–
231	Oak Bluffs	1,691	–	–	–	–	–	–	–	–	–	–	–	–
232	Sudbury	1,686	–	–	–	–	–	–	–	–	–	–	–	–
233	Norwell	1,682	–	–	–	–	–	–	1	–	–	–	–	–
234	Cheshire	1,657	–	–	–	–	–	–	–	–	–	–	–	–
235	Pembroke	1,635	–	–	–	–	–	–	1	–	–	–	–	–
236	Shelburne	1,613	–	–	–	–	–	–	–	–	–	–	–	–
237	Plainville	1,608	–	–	–	–	–	–	1	–	–	–	–	–
238	Lincoln	1,581	–	–	–	–	–	–	–	–	–	–	–	–
239	Newbury	1,581	1	–	–	–	–	–	–	–	–	–	3	–
240	Carver	1,578	–	–	–	–	–	–	–	–	–	–	–	–
241	Colrain	1,571	–	–	6	–	–	–	–	–	–	–	27	1
242	Sterling	1,561	–	–	–	–	–	–	–	–	–	–	8	–
243	Southwick	1,548	–	–	1	–	–	–	3	–	–	–	4	–
244	Buckland	1,545	–	–	–	–	–	–	–	–	–	–	–	–
245	Littleton	1,538	1	–	3	–	–	–	4	–	–	–	115	–
246	Sandwich	1,524	–	–	1	–	5	–	–	–	–	–	4	–
247	Rowley	1,509	–	–	–	–	–	–	–	–	–	–	–	–
248	Essex	1,488	–	–	–	–	–	–	–	–	–	–	–	–
249	West Newbury	1,467	–	–	–	–	–	–	–	–	1	–	–	–
250	Orleans	1,451	–	–	–	–	–	–	4	–	–	–	–	–
251	Lakeville	1,430	1	–	24	–	–	–	–	–	–	–	–	–
252	Edgartown	1,412	–	–	–	–	–	–	–	–	–	–	–	–
253	Boylston	1,389	–	–	–	–	–	–	–	–	–	–	–	–
254	Huntington	1,356	–	–	–	–	–	–	–	–	–	–	–	–
255	Chester	1,351	–	–	–	–	–	–	–	–	–	–	1	–
256	Clarksburg	1,337	–	–	–	–	–	–	–	–	–	–	–	–
257	Tyngsboro	1,328	–	–	2	–	–	–	5	–	–	–	9	–
258	Dover	1,316	–	–	–	–	–	–	–	–	–	–	14	–
259	Brookfield	1,305	–	–	44	–	–	–	7	–	–	–	9	–
260	Russell	1,288	–	–	1	–	–	–	–	–	–	–	1	–
261	Mendon	1,282	–	–	1	–	–	–	1	–	–	–	2	–
262	Erving	1,281	–	–	–	–	–	–	–	–	–	–	–	–
263	West Brookfield	1,258	–	–	6	–	–	–	6	–	–	–	15	–
264	Lanesboro	1,244	–	–	–	–	–	–	–	–	–	–	–	–
265	Rochester	1,238	–	–	21	–	–	–	–	–	–	–	–	–
266	Wenham	1,204	–	–	–	–	–	–	–	–	–	–	–	–
267	Stow	1,195	–	–	28	–	–	–	–	–	–	–	29	–
268	Sunderland	1,184	–	–	–	–	–	–	–	–	–	–	–	–
269	Berkley	1,160	–	–	–	–	–	–	–	–	–	–	–	–
270	Hinsdale	1,144	1	–	–	–	–	–	1	–	–	–	3	–
271	West Stockbridge	1,139	–	–	3	–	–	–	2	–	–	–	11	–
272	Whately	1,133	–	–	–	–	–	–	–	–	–	1	–	–
273	Topsfield	1,126	–	–	1	–	–	–	10	–	–	–	10	–
274	Berlin	1,093	–	–	–	–	–	–	–	–	–	–	–	–
275	Hubbardston	1,000	–	–	–	–	–	–	–	–	–	–	–	–
	TOWNS UNDER 1,000	*42,098*	*6*	*1*	*149*	–	*2*	–	*35*	–	–	–	*513*	–
276	Sherborn	999	–	–	–	–	–	–	2	–	–	–	–	–
277	Gill	996	–	–	–	–	–	–	–	–	–	–	138	–
278	Bernardston	983	–	–	3	–	–	–	–	–	–	–	–	–
279	Granby	963	–	–	–	–	–	–	–	–	–	–	–	–
280	Wellfleet	961	–	–	–	–	–	–	–	–	–	–	–	–
281	Conway	957	–	–	1	–	–	–	–	–	–	–	16	–
282	Southampton	956	–	–	–	–	–	–	–	–	–	–	–	–
283	Ashby	955	–	–	1	–	–	–	–	–	–	–	47	–
284	Harvard	950	–	–	33	–	–	–	5	–	–	–	30	–
285	East Brookfield	947	–	–	–	–	–	–	2	–	–	–	–	–
286	Charlemont	934	–	–	–	–	–	–	–	–	–	–	–	–
287	New Marlboro	927	–	–	11	–	–	–	1	–	–	–	78	–
288	Ashfield	924	–	–	–	–	–	–	–	–	–	–	–	–

Dangerous to the Public Health, 1935—Continued

Gonorrhea		Lobar Pneumonia		Measles		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		Line No.
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
3	-	-	3	-	-	-	-	-	-	1	-	1	-	1	2	1	-	-	-	1	-	214
6	-	8	1	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	215
1	-	1	-	-	-	-	-	-	-	1	-	1	-	-	2	-	-	-	-	-	-	216
1	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	217
-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-	218
-	-	-	1	-	-	6	-	-	-	15	-	-	-	1	1	-	-	-	-	1	-	219
2	-	-	-	8	-	11	-	-	-	4	-	1	-	2	-	-	-	-	-	-	-	220
1	-	-	1	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	221
3	-	2	1	-	-	-	-	-	-	1	-	1	-	4	1	-	-	-	-	-	-	222
5	-	-	1	5	-	1	-	-	-	5	-	2	1	1	1	1	-	-	-	26	-	223
-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	224
2	-	-	-	8	-	6	-	-	-	1	-	1	-	-	2	-	-	-	-	4	-	225
-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	226
3	-	1	-	-	-	1	-	-	-	4	-	9	-	2	-	-	-	-	-	1	-	227
-	-	-	-	20	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	5	-	228
2	-	-	1	2	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	13	-	229
2	-	3	-	39	-	-	-	-	-	-	-	2	-	1	1	-	-	-	-	1	-	230
3	-	-	2	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	231
1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	232
1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	233
-	-	2	-	8	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	234
-	-	-	2	1	-	-	-	-	-	3	-	2	-	3	-	-	-	-	-	-	-	235
5	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	236
-	-	1	1	2	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-	-	-	237
2	-	-	-	2	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	238
-	-	-	2	1	-	-	-	-	-	1	-	3	-	-	-	-	-	-	-	-	-	239
2	-	-	-	3	1	-	-	1	-	-	-	2	-	2	4	-	-	-	-	-	-	240
-	-	1	2	4	-	-	-	1	-	2	-	-	-	1	-	1	1	-	-	3	-	241
1	-	3	3	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	242
1	-	6	4	10	-	2	-	-	-	-	-	3	-	-	-	-	-	-	-	4	-	243
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	244
-	-	-	-	2	-	-	-	-	-	-	-	3	-	2	3	-	-	-	-	1	-	245
-	-	-	-	1	-	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	246
-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	247
1	-	-	-	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	248
3	-	1	1	1	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	249
2	-	-	-	3	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	250
1	-	1	-	37	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	251
6	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	252
-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	253
-	-	1	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	254
-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	255
-	-	1	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	256
1	-	2	1	-	-	57	-	-	-	1	-	-	-	1	1	-	-	-	-	6	-	257
1	-	-	-	-	-	-	-	-	-	1	-	1	-	-	1	-	-	-	-	1	-	258
1	-	-	-	1	-	3	-	-	-	-	-	-	-	2	1	-	-	-	-	25	-	259
-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	260
-	-	1	-	-	-	-	-	-	-	4	-	1	-	1	-	1	-	-	-	11	-	261
-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	262
-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	5	-	263
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	264
2	-	-	-	3	-	2	-	-	-	1	-	3	-	2	-	-	-	-	-	-	-	265
-	-	2	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	266
-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	7	-	267
-	-	-	3	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	268
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-	-	-	269
-	-	1	1	-	-	-	-	-	-	2	-	1	-	1	2	-	-	-	-	-	-	270
1	-	1	-	12	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	271
1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	272
1	-	-	1	-	-	-	-	-	-	6	-	2	-	2	1	-	-	-	-	-	-	273
-	-	1	-	-	-	-	-	-	-	5	-	-	-	-	1	-	-	-	-	-	-	274
2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	275
27	-	*17*	*16*	*283*	*1*	*13*	-	-	-	*74*	*2*	*25*	*2*	*15*	*14*	*6*	*1*	*3*	*1*	*33*	*2*	
-	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1	-	276
-	-	-	-	1	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-	277
-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	278
1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	279
-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	-	280
-	-	-	1	2	-	-	-	-	-	1	-	1	-	-	1	-	-	1	-	-	-	281
-	-	2	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	282
-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	283
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	284
-	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-	-	-	-	285
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-	286
-	-	-	-	-	-	2	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	287
-	-	1	1	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	288

Cases and Deaths from Diseases

Line No.	Cities and Towns in Order of Population	Population estimated as of July 1, 1935	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		Ep. Cerebrospinal Meningitis		German Measles	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
289	Brimfield	893	–	–	–	–	–	–	–	–	–	–	–	–
290	Hampden	872	–	–	7	–	–	–	–	–	–	–	2	–
291	Royalston	851	–	–	–	–	–	–	–	–	–	–	–	–
292	Halifax	826	1	–	–	–	–	–	–	–	–	–	–	–
293	Bolton	737	–	–	6	–	–	–	–	–	–	–	32	–
294	Paxton	737	–	–	43	–	–	–	–	–	–	–	1	–
295	Boxford	734	–	–	–	–	–	–	–	–	–	–	–	–
296	Leverett	731	–	–	–	–	–	–	–	–	–	–	–	–
297	Becket	728	1	–	1	–	–	–	–	–	–	–	27	–
298	Petersham	724	–	–	2	–	–	–	1	–	–	–	2	–
299	Brewster	710	2	1	–	–	–	–	9	–	–	–	–	–
300	Granville	707	–	–	–	–	–	–	–	–	–	–	–	–
301	Princeton	706	–	–	–	–	–	–	–	–	–	–	–	–
302	Carlisle	701	–	–	–	–	–	–	3	–	–	–	–	–
303	Richmond	633	–	–	5	–	1	–	–	–	–	–	37	–
304	Cummington	618	–	–	11	–	–	–	–	–	–	–	7	–
305	Eastham	613	–	–	–	–	–	–	1	–	–	–	–	–
306	Warwick	586	–	–	–	–	1	–	–	–	–	–	–	–
307	Egremont	575	–	–	–	–	–	–	–	–	–	–	3	–
308	Plympton	563	–	–	–	–	–	–	–	–	–	–	–	–
309	Truro	544	1	–	–	–	–	–	–	–	–	–	–	–
310	Worthington	535	–	–	–	–	–	–	–	–	–	–	15	–
311	Pelham	509	1	–	–	–	–	–	–	–	–	–	–	–
312	Enfield	495	–	–	–	–	–	–	–	–	–	–	–	–
313	Sandisfield	477	–	–	–	–	–	–	2	–	–	–	–	–
314	Blandford	461	–	–	–	–	–	–	–	–	–	–	–	–
315	Chesterfield	447	–	–	1	–	–	–	3	–	–	–	1	–
316	New Salem	446	–	–	–	–	–	–	–	–	–	–	–	–
317	New Braintree	439	–	–	–	–	–	–	–	–	–	–	–	–
318	Oakham	435	–	–	–	–	–	–	–	–	–	–	–	–
319	Phillipston	430	–	–	–	–	–	–	–	–	–	–	–	–
320	Dunstable	423	–	–	–	–	–	–	–	–	–	–	6	–
321	Otis	420	–	–	4	–	–	–	2	–	–	–	22	–
322	Florida	415	–	–	–	–	–	–	–	–	–	–	–	–
323	Boxboro	414	–	–	5	–	–	–	1	–	–	–	9	–
324	Windsor	414	–	–	–	–	–	–	–	–	–	–	–	–
325	Hancock	413	–	–	–	–	–	–	–	–	–	–	–	–
326	Westhampton	408	–	–	–	–	–	–	–	–	–	–	–	–
327	Wendell	402	–	–	12	–	–	–	–	–	–	–	1	–
328	Wales	384	–	–	–	–	–	–	–	–	–	–	–	–
329	Mashpee	382	–	–	–	–	–	–	–	–	–	–	–	–
330	Dana	375	–	–	–	–	–	–	–	–	–	–	–	–
331	Heath	372	–	–	–	–	–	–	–	–	–	–	–	–
332	Plainfield	334	–	–	–	–	–	–	–	–	–	–	–	–
333	Monterey	325	–	–	–	–	–	–	–	–	–	–	25	–
334	Hawley	308	–	–	–	–	–	–	1	–	–	–	–	–
335	Savoy	298	–	–	–	–	–	–	–	–	–	–	–	–
336	West Tisbury	283	–	–	–	–	–	–	–	–	–	–	–	–
337	Rowe	275	–	–	–	–	–	–	–	–	–	–	–	–
338	Goshen	258	–	–	–	–	–	–	–	–	–	–	–	–
339	Washington	255	–	–	–	–	–	–	–	–	–	–	–	–
340	Chilmark	253	–	–	–	–	–	–	–	–	–	–	–	–
341	Leyden	253	–	–	–	–	–	–	–	–	–	–	–	–
342	Tyringham	243	–	–	–	–	–	–	–	–	–	–	8	–
343	Monroe	242	–	–	–	–	–	–	–	–	–	–	–	–
344	Shutesbury	241	–	–	–	–	–	–	–	–	–	–	–	–
345	Middlefield	222	–	–	–	–	–	–	–	–	–	–	–	–
346	Greenwich	217	–	–	–	–	–	–	–	–	–	–	–	–
347	Alford	211	–	–	3	–	–	–	2	–	–	–	6	–
348	Holland	207	–	–	–	–	–	–	–	–	–	–	–	–
349	Montgomery	177	–	–	–	–	–	–	–	–	–	–	–	–
350	Gay Head	158	–	–	–	–	–	–	–	–	–	–	–	–
351	Peru	155	–	–	–	–	–	–	–	–	–	–	–	–
352	Tolland	141	–	–	–	–	–	–	–	–	–	–	–	–
353	Gosnold	130	–	–	–	–	–	–	–	–	–	–	–	–
354	New Ashford	96	–	–	–	–	–	–	–	–	–	–	–	–
355	Mt. Washington	64	–	–	–	–	–	–	–	–	–	–	–	–
356	Prescott	15	–	–	–	–	–	–	–	–	–	–	–	–
357	Tewksbury State Infirmary		–	–	–	–	1	–	–	–	–	–	–	–

Dangerous to the Public Health, 1935—Concluded

Gonorrhea		Lobar Pneumonia		Measles		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	289
–	–	–	–	1	–	3	–	–	–	–	–	3	–	–	1	–	–	–	–	–	–	290
1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	291
2	–	–	–	–	–	–	–	–	–	4	–	2	–	–	–	–	–	–	–	–	–	292
–	–	–	1	4	–	2	–	–	–	1	–	–	–	1	1	–	–	–	–	–	–	293
1	–	–	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–	18	1	294
1	–	–	–	–	–	2	–	–	–	3	–	–	–	–	1	–	–	–	–	–	–	295
–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	296
–	–	1	–	3	–	–	–	–	–	9	1	–	–	1	1	–	–	–	–	–	–	297
–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	–	298
–	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	299
–	–	2	3	17	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	300
–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	301
–	–	–	–	14	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	302
1	–	–	–	9	–	–	–	–	–	1	–	–	–	–	–	1	1	–	–	–	–	303
3	–	1	–	49	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	304
–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	305
–	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	1	–	1	–	–	–	306
–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	307
–	–	–	2	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	308
–	–	–	–	1	–	–	–	–	–	18	–	1	–	2	1	–	–	–	–	–	–	309
2	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	310
–	–	–	–	54	–	–	–	–	–	2	–	1	1	–	–	–	–	–	–	–	–	311
–	–	–	–	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	312
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	313
–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	314
–	–	–	–	3	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	315
–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	316
1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	317
–	–	–	–	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	318
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	319
–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	320
1	–	–	–	24	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	321
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	322
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	323
1	–	–	–	–	–	–	–	–	–	–	–	1	–	1	1	–	–	–	–	–	–	324
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	325
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	326
1	–	2	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	1	–	327
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	328
2	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	329
–	–	–	1	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	330
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	331
–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	332
–	–	–	–	5	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	333
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	334
2	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	335
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	336
–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	337
1	–	–	–	2	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	338
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	339
1	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	340
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	341
–	–	–	–	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	342
1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	343
1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	344
–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	345
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	346
–	–	–	–	14	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	347
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	348
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	349
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	350
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	351
–	–	–	–	2	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	352
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	353
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	354
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–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	356
–	–	38	4	1	–	–	–	2	–	4	–	–	–	71	6	1	–	–	–	–	–	357

In addition to the foregoing there occurred 3 cases of actinomycosis with 3 deaths.

	Cases	Deaths
Boston	2	2
Cambridge	–	1
Fitchburg	1	–

3 cases of anthrax:

	Cases	Deaths
Lynn	2	–
Sheffield	1	–

36 cases of dysentery with 7 deaths:

	Cases	Deaths
Amebic		
Boston	2	–
Cambridge	1	–
Fitchburg	1	–
Medford	1	–
Middleborough	1	1
New Bedford	1	–
Saugus	1	–
Worcester	4	–
Bacillary		
Boston	7	1
Falmouth	1	–
Malden	1	–
Medfield	1	–
Melrose	1	–
Methuen	–	1
Quincy	1	–
Somerville	1	1
Watertown	1	–
Worcester	10	3

16 cases of encephalitis lethargica with 16 deaths:

	Cases	Deaths
Belmont	1	–
Boston	–	4
Braintree	–	1
Chelmsford	–	1
Leominster	1	1
Lynn	2	2
Marlborough	1	–
New Bedford	1	–
Peabody	1	–
Provincetown	–	1
Salem	1	1
Springfield	4	2
Swampscott	1	–
Stow	–	1
Sutton	1	–
Townsend	–	1
Uxbridge	1	–
Webster	–	1
Westford	1	–

1 case of hookworm:

	Cases	Deaths
Foxborough	1	–

17 cases of malaria with 1 death:

	Cases	Deaths
Abington	1	–
Andover	1	–
Belmont	1	–
Boston	5	1
Brockton	1	–
Cambridge	1	–
Chelsea	2	–
Newton	1	–
Revere	1	–
Salem	1	–
Springfield	1	–
Watertown	1	–

5 cases of paratyphoid fever with 1 death:

	Cases	Deaths
Boston	1	–
Chelsea	1	–
Everett	1	–
Haverhill	1	–
Lanesborough	–	1
Tewksbury	1	–

17 cases of pellagra with 16 deaths:

	Cases	Deaths
Attleboro	1	–
Beverly	1	1
Boston	6	5
Brockton	1	1
Cambridge	1	–
Chelsea	1	–
Foxborough	–	1
Milford	–	1
Needham	1	1
Revere	1	1
Salem	1	1
Saugus	–	1
Stoneham	–	1
Stoughton	1	1
Waltham	2	1

2 cases of rabies with 2 deaths:

	Cases	Deaths
Cambridge	1	1
Woburn	1	1

195 cases of septic sore throat with 39 deaths:

	Cases	Deaths
Amherst	3	–
Andover	1	–
Arlington	2	1
Athol	1	–
Attleboro	1	1
Auburn	1	–
Belchertown	–	1
Beverly	1	1
Boston	50	3
Bridgewater	1	–
Brookline	1	–
Cambridge	4	2
Chelsea	–	1
Chicopee	5	1
Colrain	1	–
Danvers	2	–
Dighton	1	–
Dunstable	1	–
East Bridgewater	1	–
Everett	4	1
Fall River	9	–
Fitchburg	1	–
Foxborough	2	1
Framingham	1	–
Gardner	3	–
Goshen	1	–
Gloucester	–	1
Greenfield	5	1
Lawrence	–	2
Leominster	1	–
Lexington	2	–
Lowell	6	3
Lynn	10	2
Malden	3	–
Mansfield	1	1
Marlborough	1	1
Medford	8	2
Melrose	1	–
Millville	–	1
Montague	1	–
New Bedford	1	1
Newton	2	–
Northbridge	1	–
Northfield	7	–
Palmer	–	1
Quincy	2	2
Revere	2	–
Russell	2	–
Shirley	2	1
Somerville	1	1
Springfield	1	3
Stoneham	2	–
Taunton	–	1
Topsfield	3	–
Tyngsborough	1	–
Walpole	–	1
Waltham	25	–
Watertown	1	–
Weston	1	–
Williamstown	2	–
Winchester	1	–
Winthrop	1	–
Yarmouth	–	1

22 cases of tetanus with 20 deaths:

	Cases	Deaths
Arlington	1	–
Auburn	–	1
Boston	2	2
Fall River	1	–
Fitchburg	1	–
Great Barrington	1	–
Haverhill	1	–
Hingham	1	1
Lynn	1	–
Medford	2	1
Milford	–	1
Nantucket	1	1
Natick	–	1
New Bedford	1	–
Pelham	1	1

	Cases	Deaths
Quincy	1	1
Rockland	–	1
Royalston	–	1
Salem	1	–
Springfield	2	3
Taunton	1	1
Ware	–	1
Watertown	1	–
Weymouth	1	1
Wilbraham	–	1
Woburn	1	1

31 cases of trachoma:

Bedford	1	–
Boston	14	–
Brockton	1	–
Cambridge	1	–
Chelsea	1	–
Fitchburg	1	–
Haverhill	1	–
Lawrence	1	–
Lexington	1	–
Medford	1	–
New Bedford	1	–
Pittsfield	1	–
Revere	1	–
Somerville	1	–
Springfield	1	–
Westwood	1	–
Worcester	2	–

47 cases of trichinosis with 2 deaths:

Adams	3	–
Arlington	1	–
Belmont	1	–
Beverly	1	–
Boston	9	–
Brockton	4	–
Brookline	1	–
Deerfield	1	–
Easthampton	2	–
Erving	1	1
Falmouth	1	–
Georgetown	2	–
Greenfield	5	–
Methuen	2	1
New Bedford	1	–
Plymouth	1	–
Reading	11	–

622 cases of tuberculosis, hilum:

	Cases	Deaths
Acushnet	5	–
Amherst	5	–
Arlington	1	–
Athol	9	–
Barnstable	1	–
Belmont	2	–
Boston	361	–
Bourne	2	–
Braintree	1	–
Brockton	2	–
Brookline	3	–
Cambridge	12	–
Chelsea	1	–
Concord	1	–
Dartmouth	6	–
Easthampton	8	–
Everett	3	–
Fall River	5	–
Falmouth	3	–
Fitchburg	7	–
Framingham	1	–
Gardner	1	–
Gloucester	2	–
Hamilton	1	–
Hardwick	3	–
Haverhill	3	–
Hingham	1	–
Holden	1	–
Holyoke	10	–
Hopedale	1	–
Lancaster	1	–
Lawrence	7	–
Leominster	1	–
Lexington	1	–
Lowell	3	–
Ludlow	5	–
Lynn	5	–
Malden	5	–
Medford	1	–
Methuen	1	–
Millbury	1	–
Needham	1	–
New Bedford	69	–
Newburyport	1	–
Newton	1	–
North Adams	1	–
North Brookfield	1	–
Northampton	2	–
Peabody	1	–
Pittsfield	5	–
Plymouth	1	–
Quincy	14	–
Rehoboth	1	–
Revere	3	–
Salem	1	–
Somerville	5	–
Southbridge	1	–
Southwick	1	–
Springfield	6	–
Sunderland	2	–
Uxbridge	1	–
Wakefield	1	–
Watertown	4	–
Webster	1	–
Wellesley	1	–
Westfield	3	–
Winthrop	1	–

2 cases of typhus fever:

Beverly	1	–
Chelsea	1	–

42 cases of undulant fever with 1 death:

Adams	1	–
Amesbury	1	–
Amherst	1	–
Andover	1	–
Auburn	1	–
Boston	1	–
Brookline	1	–
Cambridge	1	–
Clinton	1	–
Danvers	1	–
Greenfield	1	–
Hinsdale	1	–
Holden	1	–
Holyoke	1	–
Kingston	1	–
Millbury	1	–
Natick	1	–
New Bedford	1	–
North Adams	3	–
Northampton	1	–
Northbridge	1	–
Pittsfield	1	–
Quincy	1	–
Somerville	2	–
Templeton	1	–
Upton	1	1
Webster	1	–
Wellesley	1	–
Westfield	1	–
West Brookfield	1	–
Williamsburg	2	–
Williamstown	1	–
Worcester	6	–

REPORT OF FOOD AND DRUG DIVISION

Hermann C. Lythgoe, *Director*

The Food and Drug Division during the year 1935 has been engaged in the usual routine work relative to the enforcement of the laws pertaining to the sale of milk, food and drugs; the slaughtering laws; the cold storage laws; the bakery law; the mattress law; the frozen dessert law; the law pertaining to the pasteurization of milk; and the law pertaining to the sale of wood alcohol; as well as in the examination of liquors and chemicals submitted by Police Departments.

The Legislature of 1935 made several changes in existing laws and enacted new laws putting additional duties upon the Department. There was a change in the narcotic law, in which the words "Cannabis Indica and Sativa" were changed to "Cannabis" and a definition of "Cannabis" was placed in the law. Two sections were added, providing that any person who manufactures, compounds, mixes, cultivates, or by any other process produces or prepares narcotic drugs shall obtain a license from the Department, and that no person as a wholesaler shall supply the same without first obtaining a license from the Department. Retail pharmacists are exempted. Under this change in the law, the Department has issued 48 licenses.

A change was made in the law pertaining to the licensing of manufacturers and bottlers of non-alcoholic beverages, mineral and spring waters, providing for an increased license fee, amounting to $20, one half of which is to be paid to the Department by the town issuing the permit. Out-of-State beverage and spring water plants were by the same Act required to obtain a permit from the Department if the product were to be sold in Massachusetts, the fee being $20, payable to the Commonwealth. Under this section of the statute, the Department issued 22 permits.

There was also a change in the law pertaining to the manufacture of bedding and upholstered furniture, providing that if feathers, down, or secondhand material were used, such material must be sterilized, and if sterilized within the Commonwealth, by a person holding a license from the Department, the license fee being $50. One such license has been issued and several applications have been received but the licenses have not yet been granted, pending an inspection of the premises together with a satisfactory efficiency test to be made upon the product before and after sterilization.

Under the frozen dessert law, the Department has issued 27 permits to out-of-State manufacturers, the fees, which depend upon the quantity sold, amounting to $676.34.

Under the law pertaining to the issuing of State licenses to dealers in wood alcohol or material containing more than 3% of wood alcohol, the Department has issued 134 licenses at $10 per license.

The Department also licensed 56 cold storage warehouses at $10 per license.

The total amount of fees for licenses and permits was $4,156.34.

Prosecutions

The prosecutions were less in number than in 1934 and were below the average for the past five or six years. One reason was an improvement in the quality of the cheap meat sold in the various retail markets. There was practically no confectionery containing alcohol, and the work in connection with the sale of eggs was much curtailed by the passage of an Act defining fresh eggs, the Act to be enforced by the Department of Agriculture. When the Act went into effect, it was ascertained from that Department that it was the intention to educate the dealers, and consequently the Department made few collections of eggs designated as "Fresh" and therefore the violations of the cold storage egg law were not detected to the extent in former years inasmuch as most of the cases involving cold storage eggs pertained to the sale of such eggs under the designation of "Fresh Eggs."

For violations of the milk law there were five cases involving the sale of low standard milk; ten cases involving the sale as pure milk of milk which had been more or less skimmed; and fourteen cases for the sale of milk containing added water. The number of watered milk cases was somewhat in excess of that of previous years, due to a change in the method of collecting samples. There was one case involving the sale of milk with a lower fat content than specified upon the cap of the bottle; fourteen cases for representing unpasteurized milk as pasteurized; and eleven cases for violation of the pasteurization law and regulations. These violations of the pasteurization law were less than those for last year. There were seven cases for violations of the milk grading law, both under the old grades and under the new grades which went into effect in May.

There was one case tried in Springfield, involving the sale of sour cream containing gelatin, and another case against the same defendant for the sale of cheese containing gelatin. This case was five days in trial. Mr. Caporelli, Prosecuting Attorney appointed by the City of Springfield, tried the case on the part of the Commonwealth. In addition to the technical points involved in the case, including one of jurisdiction, there was technical evidence offered to bring discredit upon the method of analysis, which method was an official method of the Association of Official Agricultural Chemists. The nature of the criticism of the method became apparent during the trial, and consequently the chemists of the division began a serious study of the Methods of the Association, together with some other methods published, which were not official methods. The cases resulted in conviction in both instances, with the imposition of a fine of $200. The defendant appealed but subsequently withdrew the appeal and paid the fine.

The critical study of the methods was continued, and a paper by Mr. Carl S. Ferguson and Mr. Phileas A. Racicot was presented at the Meeting of the Association of Official Agricultural Chemists in Washington during November. The original official method is still an official method, but an explanatory note as to the appearance of the precipitate involved was added.

There were three cases subsequently brought for the sale of sour cream colored with annato. These cases were brought in South Boston, Malden, and Worcester. One was dismissed; the other two cases were discharged. The defense contended that the article was not milk under the milk law and quoted the decision pertaining to concentrated milk. In the case tried in Springfield this technical question was not raised. In future cases involving violations of this character, the Department will proceed under the general food and drug law.

There were a number of cases involving the illegal use of sodium sulphite in meat and meat products. In some instances the package was labeled as required by law but contained more of the preservative than the statute permitted. In other cases the package was not labeled and contained either more or less than the quantity permitted by statute.

There were a number of cases involving the sale of adulterated olive oil, the adulterant in all the cases being cottonseed oil. There were also a number of cases regarding the sale of misbranded oil. One case was carried to the Supreme Court, and in the decision handed down several points were covered, including the right of the Department to seize food samples intended for analysis. It is necessary under one definition of misbranding for the purchaser to be ignorant of the contents of the package, although under another definition of misbranding the defendant could be held even though the purchaser were aware that he had obtained a misbranded article. The Court also held that if the defendant received a sealed sample sufficiently large to make the necessary analysis, the statute had been complied with even if the sealed sample were less than one-half of the contents of the package.

There were a number of cases involving the sale of sweet pickles containing benzoic acid without the package being labeled, and there were four cases involving the sale of such material containing saccharine. The sale of decomposed food was less than in former years. There were three cases relating to butter; three relating to eggs; thirty-three relating to hamburg steak; seven relating to sausages; and two relating to the use of decomposed eggs in the manufacture of food products. There were fifteen cases for violation of the frozen dessert law and regulations; two cases for operating soft drink factories without license; and two cases against the same defendant for violation of the sanitary food law. There were two cases for the sale of adulterated drugs; three cases for violations of the cold storage law, all pertaining to the sale of cold storage eggs. There were four cases for violation of the slaughtering laws. Two of these cases were dismissed, owing to a faulty complaint. Subsequent to the close of the fiscal year, these defendants were brought before the Court under another complaint involving the same evidence, which cases resulted in conviction. There were nineteen cases for violation of the bedding law and two cases for obstruction of an inspector.

A summary of the prosecutions will be found in table 1.

During 1934, a total of 14,046 samples were examined. During 1935 this number was 16,359, distributed as follows: —

Milk, chemical	6,959
Milk, bacteriological	3,886
Frozen desserts, bacteriological	1,269
Food, bacteriological	50
Empty bottles, supposed to be sterilized	32
Food, chemical	2,776
Food, for alleged poison	6
Drugs	272
Mattress and upholstered furniture filling	34
Industrial preparations for the quantity of wood alcohol	384
Liquor for police departments	558
Drugs and chemicals for police departments	134
Coal for Division of Standards	1

Of the samples of milk examined chemically, 6,798 were collected by the inspectors and had an average composition of 12.58% total solids and 3.93% fat. Of these samples, 117 were either watered or a portion of the cream had been removed. Excluding these samples, the averages were 12.61% solids and 3.94% fat. The lowest average solids on samples not declared adulterated was during the month of August. There were 505 such samples with an average composition of 12.36% solids and 3.84% fat. The highest average solids in milk not declared adulterated was during October, there being 648 such samples with an average solids of 12.88%, and an average fat of 4.06%. The State Standard for milk solids is 12.00%, and for milk fat, 3.35%. The requirement for Grade A milk is not less than 4.00% fat. It is very evident that the average market milk sold in Massachusetts is almost the equal of Grade A milk as far as the chemical constituents are concerned.

The practice developed last year, of obtaining chemical samples as well as bacteriological samples in the pasteurization establishments, was continued, which resulted in finding more evidence of the sale of watered milk than would otherwise be ascertained by an examination of the milk sold at retail.

A summary of the milk statistics will be found in tables 2 and 3.

The number of milk samples collected for bacteriological purposes was slightly less than was collected during 1934 but considerably more than the difference was collected in ice cream samples, the total bacteriological examinations being in excess of those made during 1934.

The Milk Regulation Board promulgated the grades which went into effect on May 8, the day they were approved by the Governor and Council. Prior to this there were but two grades of milk, namely, Grade A milk, which was pasteurized, and Massachusetts Grade A milk, which was raw milk. The grades established were:—certified milk, certified pasteurized milk, Grade A milk raw, Grade A milk pasteurized, raw milk, pasteurized milk, special milk raw, and special milk pasteurized. The special milk was a grade between Grade A milk and certified milk, except that the requirement for the high chemical standard was omitted and such milk could be sold if it complied with the statutory standard for solids and fat.

Table 4 gives a summary of the bacteriological examinations of milk.

There were only two samples of certified pasteurized milk exceeding the counts specified. The highest count on this milk was 750. The standard is not to exceed 500. There were but two samples of certified milk exceeding the 10,000 count maximum, the highest count being 22,000. There were 157 samples of these two grades of milk examined.

There was found to be considerable violation of the special milk grade. One reason was the use of a "Special" cap placed upon ordinary milk for trade purposes. The regulations provided for six months' time in which to use up caps on hand provided that the grade designation was clearly set forth. Many of the small dealers took advantage of this and said they believed they were allowed to continue the sale of this milk until the eighth day of November. Many samples of the so-called "Special" milk were not examined bacteriologically because the dealer stated at the time they were obtained that the milk was not produced under the requirement for the "Special" grade. One of these requirements was the examination of all employees coming in contact with such milk to ascertain whether or not they were typhoid carriers, the examination of the specimens of body fluids to be made by the Department of Public Health. In all but one case one warning by the inspector was sufficient to stop the sale of that type of milk. In that case, where the person did not change his cap, a hearing was given and the producer immediately supplied the necessary specimens for examination. The milk in that case was actually "Special" milk. It was a pasteurized milk with a count of 800.

The new grades lowered the maximum count for Grade A pasteurized milk from 25,000 to 10,000. Of the 187 samples examined, 66 were above the 10,000 count, although in this respect it should be understood that for a six months' period the dealers had been operating under the old standard of 25,000 and consequently all of these 66 samples were not in violation of the grade in existence at the time the sample was taken.

The raw Grade A milk took the place of the old Grade A Massachusetts milk. There were only a few samples of this milk taken, most of which conformed with the grade requirements. The largest number of samples collected pertained to pasteurized milk, either sold as such or raw milk to be pasteurized.

The new grades changed the counts, making a maximum of 40,000 instead of 50,000 in the case of pasteurized milk, and a maximum of 400,000 in place of 750,000 in the case of raw milk intended to be pasteurized. In the case of pasteurized milk, almost three-quarters of the samples were less than the former Grade A maximum requirement of 25,000. There were, however, 312 samples with counts above the 40,000 figure. Of the 2,112 samples of raw milk intended to be pasteurized only 298 were above the 400,000 count. The raw milk sold as such made a very creditable showing, very few samples being above the 400,000 count set for such milk.

There were 22 samples of cream collected, and 12 were found to be above the 100,000 count set for such material, the highest count being 19,000,000, which happened to be the highest count of any of the milk or milk products samples examined.

There were 1,038 samples of ice cream examined: 709 samples with counts below 50,000; 862 samples with counts below 100,000; and 176 samples with counts above the 100,000 maximum set by the Department. There were 11 samples of sherbet, 4 of which had counts above the 50,000 maximum set by the Department, the maximum count on the sherbet being 320,000, and on the ice cream being 5,000,000.

The ice cream bacterial count is on the average higher than it should be. During the process of pasteurization of the mix the temperature is usually somewhat higher than that applied to the commercial pasteurization of milk, one reason being that no question of destruction of cream line is involved. The material contains considerable sugar, which acts to some extent as a preservative. The material, furthermore, is kept frozen after manufacture, and under these conditions there is little opportunity for the bacteria to grow, whereas milk is kept at an average temperature considerably above the freezing point, usually between 40° F. and 60° F. Of the pasteurized milk, 72% had a count of 40,000 or less. Only 68% of the ice cream had a count below 50,000. Eighty-nine per cent of the raw milk to be pasteurized for Grade A purposes had a count below 100,000, and only 82% of the pasteurized ice cream had a count below this figure.

In addition to work on milk and cream there were considerable bacteriological examinations made of empty milk bottles and empty soft drink bottles to ascertain whether or not they had been properly cleaned and sterilized; of canned foods suspected of being decomposed; and there were also some other bacteriological studies pertaining to the wholesomeness of foods.

Table 5 gives a summary of the analyses of food samples.

The single bakery products sample reported adulterated was a sample of cookies about which a complaint had been received. The cookies were said to be wormy and the store selling the same had been approached by the person complaining.

An inspector went to the store and purchased some more of the wormy cookies and ascertained that the original unopened packages were not wormy. The vendor was prosecuted.

Of the seven samples of butter reported adulterated, two had a decidedly cheesy odor, due to decomposition products; and two were sweet butter containing less than 80% of fat. The balance were mouldy.

The two samples of confectionery reported adulterated were found upon bacteriological examination to contain bacteria of the colon group. Alleged cases of sickness were involved in the sale of this material.

The nineteen samples of cheese reported to be adulterated included the cheese containing annato and containing gelatin, and also cheese containing a gum, the exact nature of which has not as yet been determined. There was also obtained a sample of cheese containing a foreign fat. This sample was used in connection with a conspiracy case tried before the United States Court.

The single sample of dried fruit reported adulterated contained sulphur dioxide and was sold without the package being properly labeled.

The thirty-four samples of eggs reported were either represented as fresh and were not fresh; were found to be cold storage eggs not properly labeled; or were found to be decomposed. Many of these samples represented eggs obtained in bakeries and samples of broken out eggs.

Two samples of flavoring extracts were reported adulterated or misbranded. The balance of the extracts, although not all would be considered pure extracts, were properly labeled.

Only 9 of the 1,066 samples of frozen desserts collected were found not to conform to the chemical requirements. A few of these samples represented ice milk not properly labeled as such, and the balance represented low food solids per gallon. This latter violation was found to occur most frequently in the small size packages, probably due to incomplete filling.

In one instance it was ascertained that the manufacturer was subjecting the material to too much "over-run," that is to say, too much air was pumped into the mixture. Under ordinary conditions, ice cream contains about 80% to 90% of air. If air were not pumped into the mixture during freezing, the material would be a solid block of ice.

The fat content of the ice cream was on the average about 14%, which is considerably above the fat standard of 10%.

There were examined 15 samples of maple products, of which 8 were found to be adulterated and misbranded. Six samples of so called "maple butter" were found to be misbranded, and 2 samples of maple syrup served in restaurants were found to be adulterated.

There were 835 samples of meat products examined, of which 96 were found to be in violation of the law, the principal violations being decomposition or the improper use of sodium sulphite. This was confined very extensively to hamburg steak, and, to a less extent, to sausages. A further violation in the case of sausages was the use of excess cereal.

The amount of decomposed meat was considerably less than that obtained during recent years. The vendors of these products are apparently learning that it is inadvisable to sell bad meat.

No bad kidney or liver was obtained during the present year, and although fewer samples were collected, it should be observed that the inspectors purchase liver only when its appearance indicates that it may be decomposed.

The statute permits the use of 0.1% of sodium sulphite in meat products, provided the package containing the material is distinctly labeled to that effect. The principal violation of this statute is failure to label the package. Inspectors of the Department have been in stores and have seen customers return labeled packages, stating that they did not want that kind of material, and from information which we have received, we believe that in many stores the packages are not stamped when they go to the customers who are known to the clerks, but the packages are stamped when they are sold to a stranger, under the probable apprehension that the stranger may be an inspector.

Of the 426 samples of hamburg steak obtained, 90 contained sodium sulphite and 336 were free from this material. Twenty-seven of the samples containing sodium sulphite were found upon chemical analysis to be decomposed. Twenty of those not containing sodium sulphite were found to be decomposed. Calculated to a percentage basis, 30% of the sulphited hamburg was decomposed and only 3.95% of the non-sulphited hamburg was decomposed. All of the non-sulphited decomposed hamburg had a bad odor when it reached the laboratory, but a large number of the sulphited hamburg samples did not have this bad odor, although the decomposition products were present in sufficient quantity to warrant calling the material decomposed. Experiments made in the laboratory show that to some extent sodium sulphite will act as a deodorizer of decomposed meat.

The preservative action of this chemical is very slight and is of no commercial value in concentrations as low as 0.1%. Its principal purpose is to produce a red color, which makes the meat look like fresh meat. Meat which is chopped and allowed to remain in contact with the air for an hour or so soon turns dark.

An extensive campaign was waged against the illegal sale of olive oil. This was being carried on largely by the Italian and Greek dealers in this article. From information received at hearings, it developed that the Italian people are perfectly satisfied with cottonseed oil provided it has an "Olive Oil" label on it, but it is practically impossible to sell mixed oil containing a "Cottonseed Oil" label.

There were 398 samples in all collected, of which 24 were found to be adulterated or misbranded. There is considerable difficulty in obtaining satisfactory evidence as to the illegal sale of this article which is misbranded, if it is desired to prosecute the person who packs the material. The retail dealer is fairly well acquainted with the character of the article which he is buying; that is to say, he knows that the package is misbranded. In one case tried before a Judge who was very familiar with the Italian language, the Judge stated that the English portion of the labeling of the package was in his opinion misbranded, but the Italian portion of the label was misbranded to a greater extent.

There were 125 samples of pickles examined, of which 42 were found to be adulterated either by the addition of sodium benzoate without the proper label or by the addition of saccharin. Most of these samples traced back to a few manufacturers, who were prosecuted.

There were 10 samples of so-called "Poisoned Food" examined. Practically all of these were submitted by local Health Departments under the impression that persons had become sick with food poisoning by eating this particular food. The food was examined chemically, after which it was fed to the laboratory rat and in some instances was consumed by the analyst. In no case was anything found which would lead one to believe that the food in question was the cause of the sickness.

The single sample of popcorn reported adulterated was labeled, "Buttered Pop Corn" and the material placed upon the popcorn was not butter.

Five samples of scallops were found to be decomposed. These were sea scallops in cold storage, the owner of which questioned the inspector's judgment that the material was decomposed. The scallops were confiscated.

Fourteen samples of vinegar were found to be slightly below the legal standard.

DRUGS

Very few drug samples were found to be seriously adulterated or misbranded. Drugs which were formerly adulterated to an extent of 15% to 25% of the total samples collected are now found to be invariably up to the strength required by the Pharmacopoeia, and in those instances where the strength varies from the Pharmacopoeia requirement, this variance is far less than was formerly the case.

One sample of misbranded alcohol was rubbing alcohol labeled as to its alcohol content. The vendor purchased rubbing alcohol of that concentration, diluted it with water, and sold it under the original label.

The Argyrol Solutions reported adulterated were found to be more or less below the specified concentration. This variance in most of the cases was only slight, but in some cases was excessive. The six samples of lime water below the standard were not materially deficient in lime. Seven samples of spirit of nitrous ether were deficient in ethyl nitrite, and one sample of tincture of iodine was somewhat deficient in iodine.

Table 6 gives a summary of the drug samples.

LIQUOR SAMPLES

In connection with the liquor samples submitted by the police departments, a number of samples of whiskey were segregated and examined for the copper content for the purpose of comparing the figures with those obtained from the illegal liquor obtained during prohibition. This work was not fully completed at the close of the fiscal year. It is the intention to continue the work and publish the results early in 1936.

SANITARY INSPECTIONS

There has been a considerable increase in this type of inspection due to the frozen dessert law, the milk pasteurization law, and the recent change in the law pertaining to the bottling of carbonated nonalcoholic beverages. The inspection of all these plants is largely of a sanitary nature, although samples are frequently collected for analysis.

There were 286 frozen dessert plants inspected as to their sanitary condition. Of the 26 out-of-State frozen dessert plants selling their product in Massachusetts, 22 have been actually inspected by agents of the Department, and in the case of the other 4 plants the inspections of the City of Boston and the Town of Brookline were accepted for 2 of them, and the inspections of the State Board of Health of Vermont and the Board of Health of New York City were accepted for the other 2. The Vermont plant was subsequently inspected by one of the inspectors when he was on his vacation and was found to be in a satisfactory condition. The sanitary conditions of these plants do not measure up to those of the average milk pasteurization plant.

Hearings were held pertaining to possible revocation of permits of several of these plants. At the close of the hearings the matter was referred to the Public Health Council and the Council directed that additional inspections be made. The plants were found then to be clean. One of the plants was a branch of a large milk distributor, and the representative of the corporation stated that in the future the corporation had decided that the sanitary control of the ice cream portion of their business would be the same as that applied to the milk portion of the business, and since there had never been any question as to the sanitation of the milk plants of this company, it is presumed that there will be no more trouble of an unsanitary nature in the ice cream portion of the business of that company.

MILK PASTEURIZATION ESTABLISHMENTS

The inspectors of the Department made a total of 839 inspections of pasteurization plants. This does not include visits for the exclusive purpose of taking samples of milk for analysis. In 21 instances milk was found to be pasteurized below 142° F. or for less than thirty minutes or both. In some instances this variation was too slight to warrant prosecution. Where the variance was sufficient and satisfactory evidence was obtained, there was a prosecution. Occasionally one of the required thermometers was missing, and in 21 instances the mercury thermometers at the plants were found to be inaccurate to an extent of more than 2°.

In 26 instances the recording thermometer charts were not dated, and in 48 instances they were not labeled with the comparative readings of the mercury and recording thermometers. In 2 instances the recording thermometer charts had been destroyed prior to the expiration of twelve months. In 6 instances the leak escape feature of the leak escape valve had been plugged, thus defeating the purpose for which the valves were installed. In 8 instances the equipment was not cleaned at the close of the day's work, and in 82 instances there were unsanitary conditions of some sort. There were 12 plants found to be operating without licenses, and 16 plants that were licensed could not locate their licenses. Bad conditions of floors, walls, and ceilings were found in 6 plants, and 1 plant was found with a bad drainage condition.

When one considers that there are 715 pasteurization plants in Massachusetts, and when one considers further that more than one of the foregoing violations occurred in one plant, it is very evident that the pasteurization plants in this State are on the whole in a very satisfactory condition.

Several pieces of high temperature short time apparatus have been installed and several have been removed. The result of the efficiency tests made on this type of apparatus has been decidedly unsatisfactory. In many instances these tests were satisfactory and a fairly high efficiency was obtained, but where the bacterial count of the raw milk was low, the efficiency was frequently low.

One unsatisfactory feature was an occasional decrease in efficiency during the run. For example, one plant at the beginning of the operation showed an efficiency of 91.5%. At about the middle of the operation this efficiency dropped to 90%, and at the end of the operation the efficiency was reduced to 86.5%. The bacteria content of the milk was, on the average, about 650,000 at the beginning and about 550,000 at the end of the run. The pasteurized milk had a bacteria count of about 56,000 at the beginning; 61,000 during the middle; and 69,000 at the end of the run. In one instance the reverse was the case, the apparatus showing an efficiency of 48% in the beginning and 71% at the end of the operation. The highest count on the raw milk was 160,000. It averaged about 110,000 during the entire run. The pasteurized milk count varied between 55,000 at the beginning and 38,000 at the end. Milk of this type pasteurized in vats at 142° for 30 minutes would be expected to show a count well below 10,000.

Two plants have discontinued the use of this apparatus. One more plant has ordered vats for low temperature 30 minute holding, to be installed early in 1936, and from information received it is believed that another plant will discontinue the use of this type of pasteurizer during the spring of 1936.

The routine inspection of plants engaged in the business of bottling carbonated nonalcoholic beverages was begun early in November. Many of the plants were found to be without the new license required by the change in the law, and a great many of the establishments were found operating under decidedly unsanitary conditions. An additional inspector was appointed for this work. Under ordinary conditions, there are about 300 such plants in the State. The total revenue to the State from this number of plants would be $3,000.

One investigation made by one of the veterinary inspectors in connection with a case of sickness suspected as being of a milk-borne nature resulted in a very interesting discovery. The veterinary inspector in company with the district health officer examined the cows and found that they were apparently in good health. Samples of the milk were also found to be free from bacteria which might have caused the alleged sickness. The two officers, however, interviewed the sick person and ascertained that the women of the family were away on a vacation and the men cooked the pork sausages the way they liked them. They ascertained that some of the pig was at the farm. They went back to the farm and the veterinarian obtained samples of the pork, which, upon being examined in the laboratory, was found to be trichinous. The pork sausages had not been thoroughly cooked and the sickness was subsequently diagnosed as trichinosis.

In connection with slaughtering inspection 442 visits were made to different cities and towns, and 342 slaughterhouses and 68 markets were investigated, as well as 13 complaints of violation. There were 52 new nominees for the position of inspector of slaughtering interviewed, of which 43 were approved and 9 were disapproved. One inspector of slaughtering was removed by the Department after he had been convicted of stamping a carcass he had not seen killed and after the Board of Health that made the appointment had failed to remove him subsequent to a request to do so by this Department.

Sale of Wood Alcohol

The law relating to the sale of wood alcohol and commercial preparations containing more than 3% of wood alcohol requires a license either from the local Board of Health as applied to the town or from the Department of Public Health as applied throughout the entire State. A change was made in the law, eliminating the sale of denatured alcohol not containing methyl from the license requirement, which had up to that time been taken care of by the local licensing board. In many instances the local licensing board was also the board of selectmen and the board of health, and this change in the law created considerable confusion.

The boards of health were all notified of the changes, which were completely explained, and the Boards were also informed that the Department would make, free of charge, analyses of samples, the composition of which was in doubt. Only a few boards took advantage of this offer.

An additional letter was sent to the boards, calling attention to violation of this law by sales of wood alcohol without license, but in too many instances the illegal sale of this material continued. Only about one-third of the persons dealing in these products were found to have the license which the law required. A board of health of a city was reported to have refused to grant licenses to persons applying for the same, although in one instance one dealer in that city obtained his license by repeated insistence. In a town only one dealer was found to have a license and he said he had a hard time getting it.

The licensing of the sale of wood alcohol is highly desirable. If a dealer is under license he is more liable to be careful as to whom he makes sales, and he also would naturally be careful to apply the proper "Poison" label. In the past there have been deaths by the consumption of this material under the mistaken impression that it was denatured alcohol.

Liquor Samples for Police Departments

The examination of liquor samples for police departments has been very much reduced. The chemist who has been doing this work has been spending the balance of his time in bacteriological work, and by this means we have been able to increase the number of bacteriological analyses without any increase in the laboratory personnel. The police departments submitted 134 samples of drugs, chemicals, narcotics, etc., which is not greatly in excess of the quantity submitted during prior years.

The number of samples of coal examined in connection with the enforcement of the coal law has been very much reduced. Under the present arrangement with the Division of Standards, if a coal sample appears to be of such character that it would be unfit for ordinary use, the Department of Public Health will handle the entire case, including the sampling and the analysis. If, however, the sample appears to be fit for ordinary use but to contain an excessive quantity of impurities, the Division of Standards is to collect and grind the sample and the Department will then make the analysis of the sample after it is ground.

There were 128 bakeries inspected. A summary of the results of these inspections will be found in table 7.

Table 8 contains a summary of the confiscations of articles of food made in warehouses, slaughterhouses, stores, and markets, etc.

Cold Storage

Except as pertaining to eggs, there have been no particular violations of the cold storage law. There were 150 requests for extension of time granted, the reason for granting the request being that the goods were in proper condition for further storage. Seven requests were refused because the articles were not in proper shape for further storage. In forty-two instances no request for extension was received, and the articles were ordered removed from storage.

A summary of these extensions will be found in tables 9, 10, and 11. In tables 12, 13, 14, and 15 will be found statistics of quantities of food placed in storage and on hand in storage during the year.

Slaughtering Inspection

The local slaughtering inspectors, exclusive of Boston, reported 150,821 carcasses inspected, of which 1,736 were condemned. The largest number, 1,208, were calves; next largest, 399, were hogs. There were 116 cattle confiscated and 13 sheep.

The reasons for confiscation were: immaturity in the case of calves, 1,074 carcasses; next in order were 162 carcasses of hogs and one of a calf for enteritis; next in order were 141 carcasses for tuberculosis, consisting of 87 carcasses of hogs, 46 cattle, and 8 calves.

A summary of these inspections will be found in table 16.

A summary of the liquor report will be found in table 17.

TABLE I. — *Prosecutions for Violations of the Food and Drug Laws*

NAME	ADDRESS	COURT	DATE	RESULT
For Sale of Milk not of Good Standard Quality				
Boriea, Dennis	Worcester	Worcester	Sept. 11, 1935	Conviction
Dean, Lorenzo	Boylston	Clinton	June 5, 1935	Conviction
Kirchner, Donald	Pittsfield	Pittsfield	Aug. 7, 1935	Conviction
Newberry Company, J. J.	North Adams	North Adams	June 14, 1935	Conviction
Stimson, Arthur H. W.	Northampton	Northampton	Jan. 15, 1935	Conviction
For Sale of Milk from which a Portion of the Cream Had Been Removed				
Anderson, Jacob	Gardner	Gardner	Oct. 17, 1935	Discharged
Ashley, Henry S.	East Longmeadow	Springfield	Jan. 3, 1935	Conviction
Behilo, John	Greenfield	Greenfield	Aug. 15, 1935	Conviction
Blake, Warren P.	Peabody	Peabody	July 19, 1935	Discharged
Briggs, Edward S.	Blackstone	Blackstone	June 7, 1935	Conviction
Budrewicz, Ignace	Greenfield	Greenfield	Aug. 15, 1935	Conviction
Chiurri, Anselmo	Leominster	Leominster	Sept. 19, 1935	Conviction
Kirchner, Joseph W.	Pittsfield	Pittsfield	Aug. 7, 1935	Discharged
Luinis, Stanley	Brockton	Brockton	Sept. 12, 1935	Conviction
Semas, John	Taunton	Taunton	Feb. 28, 1935	Conviction
For Sale of Milk containing Added Water				
Alger, Frank	South Easton	Taunton	Feb. 12, 1935	Conviction
Calcia, Morris	West Sterling	Clinton	Dec. 10, 1934	Conviction
Clover Hill Farms, Inc.	Fitchburg	Fitchburg	Oct. 9, 1935	Conviction
Fickert, Alfred	North Middleborough	Middleborough	May 18, 1935	Conviction
Freeman, Ernest	Lincoln	Concord	May 6, 1935	Conviction
Freeman, Ernest	Lincoln	Concord	May 6, 1935	Conviction
Iannacci, Mary	Woburn	Woburn	May 27, 1935	Conviction
Iannacci, Nicholas	Woburn	Woburn	May 27, 1935	Conviction[1]
Murray, Richard	Lincoln	Concord	June 28, 1935	Conviction
Pervier, Charles	Sturbridge	Southbridge	Mar. 29, 1935	Conviction
Pervier, Charles	Sturbridge	Southbridge	Mar. 29, 1935	Conviction
Pervier, Charles	Sturbridge	Southbridge	Mar. 29, 1935	Conviction
Sykes, Paul Louis	Abington	Quincy	Feb. 18, 1935	Conviction
Yanacek, Antone	Acushnet	New Bedford	May 16, 1935	Conviction
For Sale of Milk with a Fat Content Less Than Specified				
Workers Cooperative Union, Incorporated	Lawrence	Lawrence	Sept. 18, 1935	Conviction
For Sale of Sour Cream containing Annatto				
Mayflower Creamery Company	Boston	South Boston	Nov. 20, 1935	Discharged
National Creamery Company, Inc.	Somerville	Malden	Mar. 20, 1935	Discharged
National Creamery Company, Inc.	Somerville	Worcester	June 19, 1935	Dismissed
For Sale of Sour Cream containing Gelatin				
National Creamery Company, Inc.	Somerville	Springfield	Jan. 16, 1935	Conviction
Representing Unpasteurized Milk as Pasteurized				
Badger Farms Creameries	Newbury	Newburyport	July 8, 1935	Conviction
Barden Cream Company	Quincy	Quincy	May 29, 1935	Conviction[2]
Barden Cream Company	Quincy	Quincy	May 29, 1935	Conviction[2]
Barden Cream Company	Quincy	Quincy	May 29, 1935	Discharged
Brox, Abraham	Dracut	Lowell	July 25, 1935	Conviction
Chapman, Gifford	Quincy	Quincy	May 29, 1935	Conviction
Chapman, Gifford	Quincy	Quincy	May 29, 1935	Conviction
Forbes, Margaret	Melrose	Malden	Mar. 21, 1935	Conviction
Gould, Leroy F.	Framingham	Framingham	Nov. 24, 1935	Conviction
Harnisch, Ernest	Methuen	Methuen	June 10, 1935	Conviction
Hogg, William	Whitman	Abington	Aug. 8, 1935	Conviction
Lavoie, Hilaire	Ludlow	Springfield	May 28, 1935	Conviction
Neizgoda, Konstanty	Holyoke	Holyoke	Jan. 25, 1935	Conviction
Shick, Jacob	Watertown	Waltham	Nov. 8, 1935	Conviction
For Violation of Pasteurization Law and Regulations				
Badger Farms Creameries	Newbury	Newburyport	July 8, 1935	Conviction
Bresnahan, Patrick	Holyoke	Holyoke	Feb. 15, 1935	Conviction
Brox, Abraham	Dracut	Lowell	July 25, 1935	Conviction
Miller, Fred	Methuen	Methuen	June 10, 1935	Conviction
Neizgoda, Konstanty	Holyoke	Holyoke	Jan. 25, 1935	Conviction
Richardson, Guy H.	Dracut	Lowell	July 25, 1935	Conviction
Rogers, Anthony	North Andover	Lawrence	July 10, 1935	Conviction
Rogers, Anthony	North Andover	Lawrence	July 10, 1935	Conviction
Rogers, Anthony	North Andover	Lawrence	July 10, 1935	Conviction
Shick, Jacob	Watertown	Waltham	Nov. 8, 1935	Conviction
Turner, Arthur	North Hanover	Abington	June 4, 1935	Conviction

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[1] Sentence suspended.

[2] Appealed, filed without plea—pending result of Bankruptcy Petition.

For Violation of the Milk Grading Law

Alta Crest Farms, Inc.	Spencer	Worcester	Apr. 29, 1935	Discharged
Alta Crest Farms, Inc.	Spencer	Worcester	Apr. 29, 1935	Dismissed
Fall River Dairy Co.	Fall River	Fall River	Oct. 11, 1935	Conviction
Richardson, Hazen K.	Middleton	Lynn	Sept. 24, 1935	Conviction
Richardson, Hazen K.	Middleton	Lynn	Sept. 24, 1935	Conviction
Soares, Manuel R.	Fall River	Fall River	Oct. 11, 1935	Conviction
Whiting Milk Cos., Inc.	Nantasket	Hingham	Sept. 9, 1935	Conviction

Butter
(Below the legal standard)

N. Y. Cut Rate Grocery Company	Dorchester	Dorchester	May 27, 1935	Conviction

Cheese
(Contained foreign fat)

Willard, Fred H.	Worcester	Worcester	Dec. 17, 1934	Conviction
Willard, Fred H.	Worcester	Worcester	Dec. 17, 1934	Conviction

Cheese
(Contained gelatin)

National Creamery Company, Inc.	Somerville	Springfield	Jan. 16, 1935	Conviction

For Sale of Adulterated or Misbranded Foods Other Than Milk and Milk Products

Clams
(Sewage polluted)

Chabra, Andrew	Saugus	Malden	June 13, 1935	Conviction
Clay, George	Hull	Newburyport	July 30, 1935	Conviction
Hinch, William A.	Revere	Chelsea	Aug. 8, 1935	Conviction[1]
Lane, Howard	Gloucester	Salem	Feb. 1, 1935	Conviction
Parker, Harry	Revere	Lawrence	Oct. 15, 1935	Conviction
Powers, John L.	Revere	Salem	Feb. 20, 1935	Conviction
Wright, John	Gloucester	Salem	Feb. 1, 1935	Conviction

Cookies
(Contained worms)

Kennedy & Co., Inc.	Boston	Boston	Sept. 25, 1935	Conviction

Flour
(Contained worms)

Atlantic & Pacific Tea Co., The Great	Marlborough	Marlborough	May 17, 1935	Conviction

Vanilla Extract
(Contained coumarin)

Roma Extract Company	Boston	Fitchburg	Apr. 26, 1935	Discharged

Hamburg Steak
(Violation of the law relative to use of sodium sulphite in meat and meat products)

American Beef Co., Inc.	Boston	Boston	Feb. 11, 1935	Conviction
Baker, Harry	Lynn	Lynn	Aug. 16, 1935	Conviction
Battaglia, Charles	Cambridge	Cambridge	Oct. 7, 1935	Conviction
Carl's Market, Inc.	Cambridge	Cambridge	June 14, 1935	Conviction
City Public Market, Inc.	Lowell	Lowell	Oct. 21, 1935	Conviction
Comman, Max	Cambridge	Cambridge	June 14, 1935	Conviction
Fairburn's Market, Inc.	Lowell	Lowell	Sept. 13, 1935	Conviction
Ganem & Sons, Joseph	Lawrence	Lawrence	May 17, 1935	Conviction
Gordon, Sam	New Bedford	New Bedford	July 26, 1935	Conviction
Greenbaum, Nathan	Amesbury	Amesbury	Feb. 8, 1935	Conviction
Gross, Benjamin	Lowell	Lowell	Aug. 21, 1935	Conviction[2]
Gustafson, Herbert P.	Gardner	Gardner	Mar. 14, 1935	Conviction
Hollis, Frank S.	Chelsea	Chelsea	Aug. 26, 1935	Conviction
Hudson Market, Inc.	Hudson	Hudson	Aug. 2, 1935	Conviction
Kline, William	Lynn	Lynn	June 21, 1935	Conviction
Kline, William K.	Lynn	Lynn	Sept. 20, 1935	Conviction
Kravitz, Robert	New Bedford	New Bedford	Aug. 13, 1935	Conviction
Lipsky, Inc., Sam	Brookline	Brookline	Oct. 14, 1935	Conviction
Lipsky, Inc., Sam	Brookline	Brookline	Oct. 28, 1935	Conviction
Mandelbaum, Aaron	Chelsea	Chelsea	Sept. 16, 1935	Discharged
Press, Hyman	Dorchester	Dorchester	Dec. 7, 1934	Conviction[3]
Sam's Market, Inc.	Springfield	Springfield	Sept. 25, 1935	Conviction
Snyder, Israel	Boston	Boston	Feb. 11, 1935	Discharged
Snyder, Sarah	Mattapan	Boston	Mar. 12, 1935	Conviction
Woburn Provision Company, Inc.	Everett	Malden	Dec. 18, 1934	Conviction

Hamburg Steak
(Contained added water)

Common, Max	Cambridge	Cambridge	Aug. 29, 1935	Conviction

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[1] Guilty; placed on probation for one year.

[2] Guilty; placed on probation for two months.

[3] Sentence suspended for one year.

For Sale of Adulterated or Misbranded Foods Other Than Milk and Milk Products — Concluded

OLIVE OIL
(Adulterated with cottonseed oil)

Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Borgia, Frank	Boston	Brockton	Apr. 6, 1935	Dismissed
Borgia, Frank	Boston	Brockton	Apr. 6, 1935	Dismissed
Carelli, Carl	Worcester	Worcester	May 28, 1935	Conviction
Maio, Dominic	Boston	Boston	Mar. 12, 1935	Conviction
Meo, Peter	Boston	Boston	Mar. 1, 1935	Conviction
Morano, Dominic	Worcester	Worcester	Mar. 15, 1935	Conviction
Nicholas, Gregory	Lynn	Lynn	May 1, 1935	Conviction
Palermo, Dominic	Worcester	Worcester	Mar. 15, 1935	Conviction
Pascarelli, John	Worcester	Worcester	May 28, 1935	Conviction
Previte, Dominic A	Boston	Worcester	Mar. 19, 1935	Discharged
Previte, Dominic A.	Boston	Worcester	Mar. 19, 1935	Conviction
Previte, Dominic A.	Boston	Worcester	Mar. 19, 1935	Conviction
Previte, Dominic A.	Boston	Boston	Mar. 28, 1935	Discharged
Previte, Dominic A.	Boston	Boston	Mar. 28, 1935	Discharged
Previte, Dominic A.	Boston	Boston	Mar. 27, 1935	Discharged
Ruggeri, Cesare	Webster	Webster	Apr. 30, 1935	Conviction

OLIVE OIL
(Misbranded oil)

Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Ballestraccio, Louis	Worcester	Worcester	Mar. 15, 1935	Conviction
Borgia, Frank	Boston	Brockton	Apr. 6, 1935	Conviction[1]
Borgia, Frank	Boston	Brockton	Apr. 6, 1935	Dismissed
Maio, Dominic	Boston	Boston	Mar. 12, 1935	Conviction
Morano, Dominic	Worcester	Worcester	Mar. 15, 1935	Conviction
Palermo, Dominic	Worcester	Worcester	Mar. 15, 1935	Conviction
Previte, Dominic A.	Boston	Worcester	Mar. 19, 1935	Discharged
Previte, Dominic A.	Boston	Worcester	Mar. 19, 1935	Discharged
Previte, Dominic A.	Boston	Worcester	Mar. 19, 1935	Discharged
Previte, Dominic A.	Boston	Boston	Mar. 28, 1935	Conviction
Previte, Dominic A.	Boston	Boston	Mar. 28, 1935	Discharged
Previte, Dominic A.	Boston	Boston	Mar. 28, 1935	Conviction
Previte, Dominic A.	Boston	Boston	Mar. 28, 1935	Discharged
Previte, Dominic	Boston	Boston	Mar. 27, 1935	Conviction

SAUSAGE
(Violation of the law relative to use of sodium sulphite in meat and meat products)

Giberti, Arthur	Boston	Boston	Jan. 11, 1935	Conviction
Guylielmo, Pasquale	East Boston	East Boston	July 16, 1935	Conviction
Moscardini, Angelo	Boston	Boston	Jan. 11, 1935	Conviction

SAUSAGE
(Contained starch in excess of 2 per cent)

Brodecki, Anthony	Southbridge	Southbridge	Nov. 15, 1935	Conviction
Greenstein, Joseph	New Bedford	New Bedford	June 19, 1935	Conviction

SAUSAGE
(Contained lungs)

Pasquale, Henry	Boston	Boston	Mar. 13, 1935	Conviction

SWEET RELISH
(Containing benzoic acid not labeled as required by the regulations)

Food Specialty Company	Worcester	Gardner	May 23, 1935	Conviction
Forcier, Zenon	Providence, R. I.	Southbridge	Nov. 15, 1935	Conviction
Growers Outlet, Inc.	Greenfield	Greenfield	July 31, 1935	Conviction
Harvard Pickle Works, Inc.	Cambridge	Boston	Jan. 21, 1935	Conviction
Jewett, Delmer M.	South Deerfield	Springfield	July 2, 1935	Conviction

SWEET RELISH
(Contained saccharine)

Harvard Pickle Works, Inc.	Cambridge	Boston	Dec. 4, 1934	Discharged
Harvard Pickle Works, Inc.	Cambridge	Boston	Jan. 21, 1935	Conviction
Harvard Pickle Works, Inc.	Cambridge	New Bedford	May 24, 1935	Conviction
National Pickling Works	Dorchester	Boston	May 22, 1935	Conviction

For Sale of Decomposed Food

BUTTER

Borden Sales Co., Inc.	Boston	Roxbury	Dec. 7, 1934	Discharged
Phillips, Inc., A. H.	Chicopee	Chicopee	Nov. 21, 1935	Conviction
Phillips, Inc., A. H.	Chicopee	Chicopee	Nov. 21, 1935	Conviction

EGGS

Brown & Sons, Inc., M.	Boston	Boston	Oct. 18, 1935	Conviction
Soter, Stephen A.	Webster	Southbridge	Nov. 15, 1935	Conviction
Winer, William	Boston	Roxbury	Jan. 23, 1935	Conviction

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[1] Guilty; placed on probation for six months.

For Sale of Decomposed Food — Concluded

Hamburg Steak

Baker, Harry	Lynn	Lynn	Aug. 16, 1935	Conviction
Brock, Harry	Roxbury	Roxbury	Dec. 20, 1934	Conviction
Brockelman Bros., Inc.	Lawrence	Lawrence	Oct. 25, 1935	Discharged
Carl's Market, Inc.	Cambridge	Cambridge	June 14, 1935	Conviction
City Public Market	Lowell	Lowell	Oct. 21, 1935	Conviction
Elder, Robert	Newburyport	Newburyport	July 12, 1935	Discharged
Fairburns, Incorporated	Lowell	Lowell	July 17, 1935	Conviction[1]
Foley, Patrick	Hudson	Hudson	Aug. 2, 1935	Conviction
Ganem & Sons, Joseph	Lawrence	Lawrence	May 17, 1935	Conviction
Ganem & Sons, Joseph	Lawrence	Lawrence	Oct. 18, 1935	Conviction
Geller, Jacob	Newburyport	Newburyport	July 5, 1935	Conviction
Goldman, Louis	Lynn	Lynn	Aug. 9, 1935	Conviction
Gordon, Simon	Cambridge	Cambridge	June 24, 1935	Conviction
Gordon, Simon	Cambridge	Cambridge	Aug. 9, 1935	Conviction
Greenbaum, Nathan	Amesbury	Amesbury	Feb. 8, 1935	Conviction
Gross, Benjamin	Lowell	Lowell	Aug. 21, 1935	Conviction[1]
Handy Dandy Stores, Inc.	Haverhill	Haverhill	July 10, 1935	Conviction
Hollis, Frank S.	Chelsea	Chelsea	Aug. 26, 1935	Conviction[2]
Hudson Market, Inc.	Hudson	Hudson	Aug. 2, 1935	Conviction
Katz, Benny	Newburyport	Newburyport	July 12, 1935	Discharged
Kline, William K.	Lynn	Lynn	Sept. 20, 1935	Conviction
Klys, John	Springfield	Springfield	Sept. 11, 1935	Conviction
Lampert, Harold	Somerville	Somerville	Sept. 11, 1935	Conviction[3]
Lisman, Isaac	Lowell	Lowell	Aug. 14, 1935	Conviction[1]
Mandelbaum, Aaron	Chelsea	Chelsea	Sept. 16, 1935	Discharged
Miller, Jack	New Bedford	New Bedford	Jan. 30, 1935	Conviction
Miller, Jack	New Bedford	New Bedford	May 9, 1935	Conviction
Shuman, David	Boston	Boston	Dec. 14, 1934	Conviction
Somers, Nathan	Springfield	Springfield	Oct. 25, 1935	Conviction
Steinburg, David	Lynn	Lynn	Aug. 16, 1935	Conviction
Taunton Public Market	Taunton	Taunton	Oct. 22, 1935	Conviction
United Meat Market	Cambridge	Cambridge	Sept. 6, 1935	Conviction
Woburn Provision Co., Inc.	Everett	Malden	Dec. 18, 1934	Conviction

Sausage

Brockelman Bros., Inc.	Lowell	Lowell	Sept. 21, 1935	Conviction[4]
Consumers Provision Co.	Worcester	Worcester	Mar. 22, 1935	Conviction
Gold, Benjamin	Malden	Malden	Apr. 12, 1935	Discharged
Growers Outlet, Inc.	Springfield	Springfield	Sept. 26, 1935	Conviction
Hill, David	Framingham	Framingham	Feb. 6, 1935	Conviction
Moro, Mrs. Rose	Framingham	Framingham	Feb. 6, 1935	Conviction
Stathis, Peter	Holyoke	Holyoke	Nov. 13, 1935	Conviction

Using Decomposed Eggs in the Manufacture of Food Products

Friend Brothers, Inc.	Lynn	Lynn	Oct. 15, 1935	Discharged
Steen, B. Edward	Somerville	Somerville	Nov. 4, 1935	Conviction[5]

False and Misleading Advertising

(Representing eggs which were not fresh as fresh eggs)

Batista, Manuel	New Bedford	New Bedford	Oct. 17, 1935	Conviction
Gatis, Angelo	New Bedford	New Bedford	Feb. 7, 1935	Conviction
Winer Company, Inc., H.	Boston	Boston	Dec. 14, 1934	Conviction
Winer Company, Inc., M.	Hull	Hingham	Sept. 9, 1935	Conviction

Ice Cream

(False advertising of ice cream)

McCann, Festus L.	West Berlin	Boston	Apr. 12, 1935	Conviction

Maple Syrup

(False advertising of maple syrup)

State Restaurant, Inc.	Fall River	Fall River	July 3, 1935	Conviction

Olive Oil

(False advertising of olive oil)

Meo, Peter	Boston	Boston	Mar. 1, 1935	Conviction

For Violation of Frozen Dessert Law

Acampora, Filomena	Worcester	Worcester	Sept. 4, 1935	Conviction
Badger Farms Creameries	Newburyport	Amesbury	Jan. 11, 1935	Conviction
General Ice Cream Company, Inc.	North Abington	Abington	Sept. 12, 1935	Conviction
General Ice Cream Company, Inc.	Worcester	Worcester	Sept. 17, 1935	—[6]
Gounaris, Demetrios	Arlington	Cambridge	July 20, 1935	Conviction
Jackson's, Incorporated	Springfield	Springfield	June 7, 1935	Conviction
Jackson's, Incorporated	Springfield	Springfield	June 7, 1935	Conviction
Kalashian Brothers	Worcester	Worcester	Mar. 6, 1935	Conviction
Shmeligian, Peter	Marlborough	Marlborough	June 21, 1935	Conviction
Sullivan, James R.	Brockton	Brockton	July 24, 1935	—[6]
Sullivan, James R.	Brockton	Brockton	July 24, 1935	Conviction
Turnbull Co., Inc., J. G.	Greenfield	Greenfield	Dec. 14, 1934	Conviction
Vergos, Peter	Natick	Natick	Apr. 25, 1935	Conviction
Watkins, Arthur F.	Peabody	Peabody	July 19, 1935	Conviction
Watkins, Arthur F.	Peabody	Peabody	July 19, 1935	Conviction

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[1] Guilty; placed on probation.

[2] Sentence suspended.

[3] Appealed; Nol Prossed.

[4] Continued for six months for sentence.

[5] Appealed.

[6] Dismissed for want of prosecution.

For Violation of Law Relative to the Manufacture and Bottling of Carbonated Non-Alcoholic Beverages, Soda Water, Mineral and Spring Water

Operating without License

Mastroianni, Dominic	North Adams	North Adams	Sept. 5, 1935	Conviction
Shaker, John	North Adams	North Adams	Sept. 5, 1935	Discharged

For Violation of Sanitary Food Law

Mastroianni, Dominic	North Adams	North Adams	Sept. 5, 1935	Conviction
Shaker, John	North Adams	North Adams	Sept. 5, 1935	Conviction [1]

For Sale of Drugs Not Conforming to the Requirements of the U. S. Pharmacopoeia

Argyrol

Sharek, Charles	New Bedford	New Bedford	June 19, 1935	Conviction

Rubbing Alcohol

Somers, Robert A.	Boston	Boston	Nov. 26, 1935	Conviction

For Violation of the Laws Relative to Cold Storage

Selling Cold Storage Eggs without Marking the Container

Deutsch, Israel	Taunton	Taunton	Dec. 13, 1934	Discharged
Kocokinski, William	Webster	Webster	Jan. 15, 1935	Conviction
Portuguese Retail Grocers' Association	New Bedford	New Bedford	Feb. 19, 1935	Discharged

For Violation of the Laws Relative to Slaughtering

As Inspector of Slaughtering Used Stamp Illegally

Harvey, George	Clarksburg	North Adams	July 12, 1935	Conviction

Slaughtering or Authorizing Slaughtering in the Absence of Inspector

Cramer, Louis	North Adams	North Adams	Aug. 2, 1935	Dismissed
Cramer, William	North Adams	North Adams	Aug. 2, 1935	Dismissed
Naleski, Walter	Auburn	Worcester	Sept. 27, 1935	Conviction
Polcaro, David	Pittsfield	Pittsfield	Apr. 30, 1935	Discharged

For Violation of the Mattress Laws

Antiseptic Mattress Co.	Lynn	Lynn	May 3, 1935	Conviction
Bartfield, Isaac	Worcester	Worcester	Dec. 17, 1934	Conviction
Canner, Benjamin	Boston	Boston	June 10, 1935	Discharged
Earnest, David	Boston	Boston	Oct. 23, 1935	Conviction
Freedman, Morris	Waltham	Waltham	Oct. 10, 1935	Conviction
Gersmann, George	Worcester	Leominster	Sept. 27, 1935	Conviction
Greene, George	Roxbury	Roxbury	Nov. 1, 1935	Conviction
Jackson Furniture Co.	New Bedford	New Bedford	Feb. 1, 1935	Conviction
Kreplick, Samuel	Worcester	Worcester	Oct. 15, 1935	Conviction
London, Benjamin	Malden	Cambridge	Mar. 15, 1935	Conviction
Meltzer, Leo	Fall River	Fall River	Nov. 15, 1935	Conviction
Meltzer, Leo	Fall River	Fall River	Nov. 15, 1935	Conviction
Pristau, Samuel	Boston	Boston	Feb. 15, 1935	Conviction
Providence Mattress Co.	Providence, R. I.	Chicopee	Aug. 1, 1935	— [2]
Providence Mattress Co.	Providence, R. I.	Chicopee	Sept. 25, 1935	Conviction
Sherman & Feinberg, Inc.	Chelsea	Boston	Oct. 25, 1935	Conviction
Sunshine Bedding Co.	Boston	Boston	Feb. 28, 1935	Conviction
Taylor, Saul	New Bedford	New Bedford	Nov. 7, 1935	Conviction
Young, Louis	Brockton	Brockton	Oct. 28, 1935	Conviction

Obstruction of an Inspector

Hook, James	Saugus	Saugus	Aug. 10, 1935	Conviction
Pomeratz, Jacob	Indian Orchard	Springfield	Nov. 20, 1935	Conviction

Table 2. — *Summary of Milk Statistics*

Number of samples above standard	5,846
Number of samples below standard	1,111
Total samples	6,957
Number having more than 15% solids	44
Number having between 14% and 15% solids	210
Number having between 13% and 14% solids	1,432
Number having between 12% and 13% solids	4,160
Number having between 11% and 12% solids	1,035
Number having between 10% and 11% solids	65
Number having between 9% and 10% solids	–
Number of samples below 9%	11
Number of samples showing removal of part of the cream	62
Number of samples showing added water	55

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[1] Appealed.

[2] Defendant defaulted.

TABLE 3. — *Average Composition of Milk Samples*

	Total Samples				Samples not Declared Adulterated			
		Average				Average		
	Number of Samples	Total Solids	Fat	Solids not Fat	Number of Samples	Total Solids	Fat	Solids not Fat
		%	%	%		%	%	%
December	259	12.79	4.04	8.75	255	12.81	4.05	8.76
January	381	12.67	3.97	8.70	373	12.70	3.98	8.72
February	469	12.67	4.00	8.67	460	12.69	4.01	8.68
March	555	12.46	3.85	8.61	530	12.61	3.91	8.70
April	895	12.43	3.83	8.60	885	12.45	3.84	8.61
May	1,079	12.57	3.94	8.63	1,055	12.60	3.95	8.65
June	578	12.59	3.96	8.63	572	12.60	3.96	8.64
July	550	12.44	3.83	8.61	540	12.45	3.85	8.60
August	511	12.34	3.82	8.52	505	12.36	3.84	8.52
September	586	12.69	3.98	8.71	582	12.71	3.99	8.72
October	653	12.87	4.06	8.81	648	12.88	4.06	8.82
November	282	12.64	3.92	8.72	276	12.72	3.95	8.77
Average for Year	6,798	12.58	3.93	8.65	6,681	12.61	3.94	8.67

TABLE 4. — *Summary of Bacteriological Examinations of Milk*

CERTIFIED AND PASTEURIZED MILK

Total samples		71
Samples with count below 50	46	
Samples with count below 500	69	
Samples with count above 500	2	
Lowest count	less than 10	
Highest count	750	

CERTIFIED MILK

Total samples		76
Samples with count below 10,000	74	
Samples with count above 10,000	2	
Lowest count	750	
Highest count	22,000	

SPECIAL MILK PASTEURIZED

Total samples		8
Samples with count below 5,000	1	
Samples with count above 5,000	7	
Lowest count	800	
Highest count	74,000	

SPECIAL MILK RAW

Total samples		5
Samples with count below 50,000	0	
Samples with count above 50,000	5	
Lowest count	97,000	
Highest count	120,000	

GRADE A MILK PASTEURIZED

Total samples		187
Samples with count below 10,000	121	
Samples with count above 10,000	66	
Lowest count	100	
Highest count	120,000	

GRADE A MILK RAW

Total samples		14
Samples with count below 100,000	12	
Samples with count above 100,000	2	
Lowest count	9,000	
Highest count	680,000	

PASTEURIZED MILK

Total samples		1,114
Samples with count below 25,000	691	
Samples with count below 40,000	802	
Samples with count above 40,000	312	
Lowest count	100	
Highest count	5,400,000	

RAW MILK SOLD AS SUCH

Total samples		246
Samples with count below 400,000	224	
Samples with count above 400,000	22	
Lowest count	800	
Highest count	1,500,000	

RAW MILK TO BE PASTEURIZED AS GRADE A MILK

Total samples		37
Samples with count below 100.000	31	
Samples with count above 100,000	6	
Lowest count	3,000	
Highest count	230,000	

RAW MILK TO BE PASTEURIZED

Total samples		2,112
Samples with count below 100,000	1,262	
Samples with count below 250,000	1,636	
Samples with count below 400,000	1,814	
Samples with count above 400,000	298	
Lowest count	below 1,000	
Highest count	3,700,000	

CREAM

Total samples		22
Samples with count below 100,000	10	
Samples with count above 100,000	12	
Lowest count	16,000	
Highest count	19,000,000	

ICE CREAM

Total samples		1,038
Samples with count below 50,000	709	
Samples with count below 100,000	862	
Samples with count above 100,000	176	
Lowest count	below 1,000	
Highest count	5,000,000	

SHERBET

Total samples		11
Samples with count below 50,000	7	
Samples with count above 50,000	4	
Lowest count	1,000	
Highest count	320,000	

MISCELLANEOUS

Total samples		77
Samples complying with requirements	40	
Samples not complying with requirements	37	

TABLE 5. — *Summary of Analyses of Food Samples*

CHARACTER OF SAMPLE	Not Declared Adulterated or Misbranded	Adulterated or Misbranded	Total
Carbonated non-alcoholic beverages	4	–	4
Alimentary pastes	3	–	3
Bakery products	1	1	2
Butter	45	7	52
Canned goods	3	–	3
Candy	3	2	5
Cereals	4	–	4
Cheese	49	19	68
Chocolate drink	2	–	2
Cream	62	6	68
Sour cream	18	14	32
Dried fruits	1	1	2
Eggs	115	34	149
Evaporated milk	18	–	18
Flavoring extracts:			
Lemon	1	1	2
Vanilla	16	1	17
Fish	1	–	1
Fruit juices	4	–	4
Frozen desserts	1,057	9	1,066
Maple butter	–	6	6
Maple sugar	1	–	1
Maple syrup	6	2	8
Meat products:			
Chicken meat	2	–	2
Fowl	–	3	3
Hamburg steak	357	69	426
Kidney	1	–	1
Liver	5	–	5
Sausage	374	24	398
Miscellaneous	12	–	12
Olive oil	78	79	157
Oranges	2	–	2
Pickles	83	42	125
Poisoned food — so called	10	–	10
Pop corn	3	1	4
Preserved fruits	2	–	2
Salad dressing	3	–	3
Scallops	1	5	6
Shortening	2	–	2
Spices and seasoning	13	–	13
Spray residues	7	–	7
Tomato paste	1	–	1
Vinegar	69	14	83
Totals	2,439	340	2,779

Table 6. — *Summary of Analyses of Drug Samples*

Character of Sample	Not Declared Adulterated or Misbranded	Adulterated or Misbranded	Total
Alcohol	5	1	6
Argyrol solution	28	7	35
Aspirin	21	–	21
Blue ointment	5	–	5
Camphorated oil	15	1	16
Chloramine tablets	5	–	5
Formaldehyde solution	5	–	5
Hydrogen peroxide	13	1	14
Lime water	21	6	27
Magnesium citrate solution	10	1	11
Mercurochrome	1	–	1
Milk of magnesia	13	–	13
Olive oil	1	–	1
Proprietary drugs	1	–	1
Quinine pills	10	–	10
Quinine sulphate and syrup of hydriodic acid	1	–	1
Spirit of ammonia, aromatic	1	–	1
Spirit of camphor	2	–	2
Spirit of nitrous ether	66	7	73
Sulphur	6	–	6
Tincture of iodine	16	1	17
Witch hazel water	1	–	1
Zinc oxide ointment	1	–	1
Totals	248	25	273

Table 7. — *Summary of Inspections of Bakeries Made by the Division*

Number of such bakeries inspected		128
Number of defects found as follows:		
Floors not properly constructed or maintained	21	
Walls not properly constructed or maintained	26	
Ceilings not properly constructed or maintained	23	
Storage facilities not properly constructed or maintained	16	
Apparatus not properly constructed or maintained	24	
Stock not properly protected	22	
Products not properly protected	19	
Flies abundant	4	
Flour storage unsatisfactory	10	
Tobacco used in bakery	7	
Absence of garbage can	13	
Domestic rooms connected with bakery	5	
Miscellaneous defects	28	
Total defects		218

Table 8. — *Confiscations*

In Warehouses

Cheese	600 lbs.	Decomposed
Cheese	620 lbs.	Decomposed
Cheese	400 lbs.	Decomposed
Cheese	270 lbs.	Decomposed
Cheese	880 lbs.	Decomposed
Cheese	78 lbs.	Decomposed
Cheese	277 lbs.	Decomposed
Chickens	85 lbs.	Decomposed
Fowl	1,715 lbs.	Decomposed
Fowl	462 lbs.	Decomposed
Pork	214 lbs.	Rancid
Veal	327 lbs.	Decomposed
Butterfish	363 lbs.	Decomposed
Butterfish	309 lbs.	Decomposed
Butterfish	734 lbs.	Decomposed
Butterfish	7,300 lbs.	Decomposed
Cod, Salt	2,000 lbs.	Decomposed
Cod, Salt	100 lbs.	Decomposed
Eels	190 lbs.	Decomposed
Halibut	145 lbs.	Decomposed
Herring, Salt	9,750 lbs.	Decomposed
Herring, Salt	600 lbs.	Decomposed
Scallops, Sea	990 lbs.	Decomposed
Scallops, Sea	1,960 lbs.	Decomposed
Shrimp	100 lbs.	Decomposed
Sole, Grey	1,700 lbs.	Decomposed
Sole, Grey	1,200 lbs.	Decomposed
Sole, Grey	5,900 lbs.	Decomposed
Squid	200 lbs.	Decomposed
Squid	625 lbs.	Decomposed

In Slaughterhouses

Beef	30 lbs.	Decomposed
Veal	30 lbs.	Decomposed

TABLE 8. — *Confiscations* — Concluded

IN STORES, MARKETS, ETC.

Butter	25 lbs.	Decomposed
Chicken	3 lbs.	Decomposed
Fowl	25 lbs.	Decomposed
Beef	100 lbs.	Decomposed
Beef, Corned	50 lbs.	Decomposed
Calves' Liver	8 lbs.	Decomposed
Hamburg Steak	30 lbs.	Decomposed
Hamburg Steak	20 lbs.	Decomposed
Hamburg Steak	18 lbs.	Decomposed
Lamb	24 lbs.	Unstamped
Frankforts	50 lbs.	Decomposed
Link Pork Sausage	25 lbs.	Decomposed
Sausage	15 lbs.	Decomposed
Shoulders	40 lbs.	Decomposed
Veal	25 lbs.	Decomposed
Veal	135 lbs.	Unstamped
Flour	80 lbs.	Wormy
Total Confiscations	40,827 lbs.	

Summary of Tables 9, 10, 11

Requests for extension of time granted		150
Eggs	35	
Poultry	14	
Meat and meat products	15	
Fish	86	
Requests for extension of time not granted		7
Eggs	4	
Fish	3	
Articles ordered removed from storage (no requests made)		42
Eggs	7	
Poultry	3	
Meat and meat products	7	
Game	6	
Fish	19	

TABLE 9. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1934, to December 1, 1935*

(Reason for such extension being that goods were in proper condition for further storage)

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Eggs	300	May 19, 1934	July 15, 1935	Frigid Food Products, Inc.
Eggs	8,190	May 8, 1934	Aug. 1, 1935	Stone Co., Charles H.
Eggs	10,320	Mar. 17, 1934	*Oct. 17, 1935	Wilson & Co.
Eggs, Mixed	19,620	Mar. 1, 1934	June 1, 1935	Stone Co., Charles H.
Eggs, Mixed	2,370	June 5, 1934	Sept. 1, 1935	Stone Co., Charles H.
Sugaryolks	6,000	Mar. 31, 1934	Aug. 14, 1935	Standard Brands, Inc.
Sugaryolks	540	Mar. 1, 1934	June 1, 1935	Stone Co., Charles H.
Sugaryolks	6,460	Apr. 7, 1934	Nov. 1, 1935	Stone Co., Charles H.
Sugaryolks	2,970	**Apr. 2, 1935	*Feb. 1, 1936	Titman Corp., Benjamin
Sugaryolks	11,550	June 1, 1934	*Dec. 31, 1935	Tranin Egg Products Co.
Egg Whites	2,970	July 4, 1934	*Dec. 1, 1935	Armour & Co.
Egg Whites	19,980	April 4, 1934	Oct. 1, 1935	Brockelman Bros.
Egg Whites	10,230	April 18, 1934	Oct. 1, 1935	Brockelman Bros.
Egg Whites	3,120	Mar. 27, 1934	June 27, 1935	Standard Brands, Inc.
Egg Whites	1,110	Mar. 27, 1934	June 27, 1935	Standard Brands, Inc.
Egg Whites	2,190	May 8, 1934	Aug. 1, 1935	Stone Co., Charles H.
Egg Whites	1,140	June 5, 1934	Sept. 1, 1935	Stone Co., Charles H.
Egg Whites	765	June 29, 1934	Aug. 1, 1935	Stone Co., Charles H.
Egg Whites	3,930	June 29, 1934	*Nov. 1, 1935	Stone Co., Charles H.
Egg Whites	13,620	April 3, 1934	Sept. 1, 1935	Wilson & Co.
Whole Eggs	36,660	April 25, 1934	Oct. 1, 1935	Borden Sales Co., Inc.
Whole Eggs	9,480	April 4, 1934	Oct. 1, 1935	Brockelman Bros., Inc.
Whole Eggs	1,260	April 2, 1934	Oct. 2, 1935	Wilson & Co.
Egg Yolks	5,400	May 20, 1934	Aug. 20, 1935	Fairmont Creamery Co.
Egg Yolks	570	Mar. 28, 1934	April 6, 1935	Frigid Food Products, Inc.
Egg Yolks	2,310	May 22, 1934	Aug. 15, 1935	Frigid Food Products, Inc.
Egg Yolks	2,280	June 3, 1934	Nov. 18, 1935	Frigid Food Products, Inc.
Egg Yolks	2,070	June 1, 1934	July 20, 1935	Great Atlantic & Pacific Tea Co.
Egg Yolks	750	Mar. 1, 1934	June 1, 1935	Stone Co., Charles H.
Egg Yolks	4,440	May 8, 1934	Aug. 1, 1935	Stone Co., Charles H.
Egg Yolks	7,380	May 8, 1934	Aug. 1, 1935	Stone Co., Charles H.
Egg Yolks	4,380	June 5, 1934	Sept. 1, 1935	Stone Co., Charles H.
Egg Yolks	7,800	Mar. 25, 1934	July 1, 1935	Thompson Spa, Inc.
Egg Yolks	2,100	April 2, 1934	Oct. 2, 1935	Wilson & Co.
Egg Yolks	2,100	April 7, 1934	Sept. 1, 1935	Winer Co., William
Broilers	662	July 10, 1934	Sept. 30, 1935	Bartlett, Varney Co.
Broilers	414	July 25, 1934	Sept. 30, 1935	Bartlett, Varney Co.
Broilers	221	July 25, 1934	Sept. 30, 1935	Bartlett, Varney Co.
Broilers	577	July 31, 1934	Sept. 30, 1935	Bartlett, Varney Co.
Broilers	235	July 31, 1934	Sept. 30, 1935	Bartlett, Varney Co.
Broilers	300	Aug. 28, 1934	Oct. 15, 1935	Greeley, James E.
Capons	504	Dec. 15, 1933	April 14, 1935	Berman & Co., Inc.
Chickens	10,837	Dec. 29, 1933	Mar. 31, 1935	Bartlett, Varney Co.
Chickens	4,299	Dec. 29, 1933	Mar. 31, 1935	Bartlett, Varney Co.
Chickens	2,106	Dec. 29, 1933	Mar. 31, 1935	Bartlett, Varney Co.

TABLE 9. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1934, to December 1, 1935* — Continued

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Roasters	490	Dec. 26, 1933	May 1, 1935	Berman & Co., Inc.
Roasters	1,430	Dec. 26, 1933	May 1, 1935	Berman & Co., Inc.
Roasters	1,647	Jan. 4, 1934	April 1, 1935	Berman & Co., Inc.
Roasters	1,640	Jan. 4, 1934	April 1, 1935	Berman & Co., Inc.
Beef	1,819	Oct. 27, 1934	Jan. 3, 1936	Chicago Dressed Beef Co.
Beef	5,902	Nov. 3, 1934	Jan. 3, 1936	Chicago Dressed Beef Co.
Beef	4,921	Nov. 6, 1934	Jan. 3, 1936	Chicago Dressed Beef Co.
Beef Livers	1,750	May 4, 1934	July 4, 1935	Folsom's Market, Inc.
Bull Meat	7,090	Sept. 28, 1934	Dec. 27, 1935	Handschumacher & Co.
Rib Roasts	8,095	Nov. 13, 1934	May 6, 1936	Frosted Food Sales Corp.
Porterhouse Steaks	5,416	Jan. 7, 1934	June 1, 1935	Frosted Food Sales Corp.
Rump Steaks	1,376	Dec. 28, 1933	Mar. 1, 1935	Frosted Food Sales Corp.
Sirloin Steaks	6,008	Nov. 9, 1934	May 6, 1936	Frosted Food Sales Corp.
Frogs' Legs	48	May 26, 1934	July 26, 1935	Foley Co., M. F.
Pork Loins	2,800	Aug. 27, 1934	Sept. 27, 1935	Dubuque Packing Co.
Pork Loins	140	Aug. 27, 1934	Sept. 27, 1935	Dubuque Packing Co.
Pork Loins	1,190	Aug. 27, 1934	Sept. 27, 1935	Dubuque Packing Co.
Pork Loins	630	Sept. 7, 1934	Sept. 27, 1935	Dubuque Packing Co.
Pork Loins	140	Sept. 11, 1934	Sept. 27, 1935	Dubuque Packing Co.
Butterfish	3,536	June 2, 1934	Dec. 2, 1935	American Fish Co.
Butterfish	865	June 14, 1934	Dec. 2, 1935	American Fish Co.
Butterfish	1,412	June 24, 1934	July 24, 1935	Bay State Smoked Fish Co.
Butterfish	1,100	June 7, 1934	Dec. 7, 1935	Busalacchi Bros.
Butterfish	1,725	June 8, 1934	Dec. 7, 1935	Busalacchi Bros.
Butterfish	4,560	June 11, 1934	Sept. 15, 1935	General Seafoods Corp.
Butterfish	2,064	July 21, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Butterfish	2,084	Aug. 3, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Butterfish	1,250	June 23, 1934	Sept. 30, 1935	Revere Smoked Fish Co.
Cod Fillets	12,000	July 1, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Cod Fillets	39,720	July 1, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Cusk Fillets	840	July 24, 1934	Nov. 1, 1935	Fink, Jack
Cusk Fillets	520	July 24, 1934	Nov. 1, 1935	Fink, Jack
Cusk Fillets	680	July 24, 1934	Nov. 1, 1935	Fink, Jack
Eels	350	Sept. 25, 1934	Oct. 25, 1935	Nagle Co., John
Eels	400	Aug. 25, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Fish Patties	2,150	June 11, 1934	Sept. 15, 1935	General Seafoods Corp.
Haddock	3,135	Sept. 6, 1934	Oct. 6, 1935	General Seafoods Corp.
Haddock	9,900	Sept. 21, 1934	Dec. 31, 1935	General Seafoods Corp.
Haddock Fillets	4,470	July 11, 1934	Aug. 15, 1935	General Seafoods Corp.
Haddock Fillets	1,860	July 16, 1934	Sept. 15, 1935	General Seafoods Corp.
Haddock Fillets	10,740	Aug. 21, 1934	Nov. 20, 1935	General Seafoods Corp.
Haddock Fillets	10,575	Aug. 25, 1934	Sept. 25, 1935	General Seafoods Corp.
Haddock Fillets	2,730	Sept. 12, 1934	Oct. 12, 1935	General Seafoods Corp.
Haddock Fillets	18,000	June 1, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Haddock Fillets	14,000	Aug. 1, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Halibut Steaks	2,670	July 16, 1934	Sept. 15, 1935	General Seafoods Corp.
Halibut Steaks	2,380	Sept. 24, 1934	Dec. 31, 1935	General Seafoods Corp.
Halibut Steaks	1,780	Sept. 26, 1934	Dec. 31, 1935	General Seafoods Corp.
Halibut Steaks	6,100	Nov. 17, 1934	Dec. 17, 1935	General Seafoods Corp.
Herring, Sardine	5,550	Nov. 2, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.
Herring, Sardine	3,425	Nov. 2, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.
Herring, Sardine	4,300	Nov. 9, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.
Mackerel	700	July 24, 1934	Nov. 30, 1935	Empire Food Markets
Mackerel	6,000	July 26, 1934	Nov. 30, 1935	Empire Food Markets
Mackerel, Dressed	300	Sept. 7, 1934	Jan. 7, 1936	Prior & Co., P. H.
Mackerel Fillets	13,095	Sept. 21, 1934	Dec. 31, 1935	Forty Fathom Fish Co.
Mackerel, Small	1,680	May 31, 1934	Sept. 30, 1935	Hoare, William J.
Pulpi	150	June 3, 1934	Dec. 3, 1935	Busalacchi, T. & J.
Pulpi	4,869	**Jan. 14, 1935	Dec. 14, 1935	Russo & Sons Co.
Salmon	3,000	Nov. 19, 1934	Feb. 19, 1936	Atlantic & Pacific Fish Co.
Salmon	420	Aug. 9, 1934	Dec. 9, 1935	Goodspeed, Inc., L. B.
Salmon	330	Oct. 2, 1934	Jan. 12, 1936	Goodspeed, Inc., L. B.
Salmon	580	Oct. 5, 1934	Jan. 12, 1936	Goodspeed, Inc., L. B.
Salmon	300	Oct. 16, 1934	Jan. 12, 1936	Goodspeed, Inc., L. B.
Salmon	600	Nov. 19, 1934	Dec. 31, 1935	Revere Smoked Fish Co.
Salmon, King	2,958	**May 8, 1935	Jan. 31, 1936	Neal Co., J. R.
Salmon, Silver	138	Oct. 31, 1934	Feb. 28, 1936	Fulham & Herbert
Salmon, Silver	400	Oct. 31, 1934	Feb. 28, 1936	Fulham & Herbert
Salmon, Silver	2,100	**May 3, 1935	Jan. 31, 1936	Harding Co., F. E.
Salmon, Silver	1,400	**May 8, 1935	Jan. 31, 1936	Neal Co., J. R.
Salmon, Silver	1,200	**May 8, 1935	Jan. 31, 1936	Neal Co., J. R.
Scallops, Sea	892	Nov. 22, 1934	Feb. 1, 1936	Harding Co., F. E.
Scup	935	May 21, 1934	Nov. 1, 1935	Mantia & Sons, John
Sea Robbins	672	May 9, 1934	July 9, 1935	Puritan Fisheries, Inc.
Sea Robbins	502	May 10, 1934	July 9, 1935	Puritan Fisheries, Inc.
Shad***	64,000	Aug. 1, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Shrimp	840	July 25, 1934	May 1, 1935	Foley Co., M. F.
Skate Wings	275	Aug. 1, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Skate Wings	250	Aug. 1, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Skate Wings	725	Aug. 3, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Skate Wings	425	Aug. 24, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Skate Wings	350	Aug. 28, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Skate Wings	1,100	Aug. 31, 1934	Dec. 31, 1935	Puritan Fisheries, Inc.
Skate Wings	1,275	Sept. 14, 1934	Jan. 31, 1936	Puritan Fisheries, Inc.
Skate Wings	650	Nov. 10, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.
Smelts	2,300	**Feb. 5, 1935	Dec. 5, 1935	Brockton Public Market
Smelts	12,700	**Feb. 5, 1935	*Dec. 25, 1935	Russo & Sons Co.

Table 9. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1934, to December 1, 1935* — Concluded

Article	Weights (Pounds)	Placed in Storage	Extension Granted to	Name
Sole Fillets	15,700	July 21, 1934	Oct. 1, 1935	Gorton-Pew Fisheries Co., Ltd.
Squid	716	June 1, 1934	Nov. 1, 1935	Mantia & Sons, John
Squid	750	June 1, 1934	Sept. 1, 1935	Russo & Sons Co.
Squid, Bone	2,790	May 18, 1934	Nov. 18, 1935	Busalacchi, T. & J.
Squid, Bone	3,296	June 1, 1934	Nov. 1, 1935	Harrison, A.
Squid, Bone	14,975	June 1, 1934	*Dec. 31, 1935	Harrison, A.
Squid, Bone	7,800	May 16, 1934	*Dec. 31, 1935	Puritan Fisheries, Inc.
Squid, Bone	8,600	May 17, 1934	*Dec. 31, 1935	Puritan Fisheries, Inc.
Squid, Bone	550	May 18, 1934	Sept. 16, 1935	Puritan Fisheries, Inc.
Squid, Bone	3,935	May 26, 1934	Sept. 16, 1935	Puritan Fisheries, Inc.
Whiting	4,600	Sept. 5, 1934	Jan. 1, 1936	Quincy Market C. S. & W. Co.
Whiting	870	Sept. 7, 1934	Jan. 1, 1936	Quincy Market C. S. & W. Co.
Whiting	935	July 24, 1934	Dec. 24, 1935	Russo & Sons Co.
Whiting	4,200	July 27, 1934	Dec. 24, 1935	Russo & Sons Co.
Whiting	1,800	Sept. 7, 1934	Feb. 7, 1936	Russo & Sone Co.
Whiting, Round	1,738	Nov. 5, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.
Whiting, Round	1,298	Nov. 6, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.
Whiting, Round	1,500	Nov. 7, 1934	Feb. 28, 1936	Puritan Fisheries, Inc.

* The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

** Received frozen and undated.

*** Bait.

Table 10. — *Requests for Extension of Time Not Granted on Goods in Cold Storage from December 1, 1934, to December 1, 1935*

Article	Weight (Pounds)	Placed in Storage	Name
Mixed Eggs	2,040	May 1, 1933	Swift & Co.
Egg Yolks	5,670	April 30, 1934	Armour & Co.
Egg Yolks	1,480	May 31, 1933	Swift & Co.
Egg Yolks	240	Feb. 17, 1934	Wilson & Co.
Grey Sole	1,700	April 7, 1934	Fulham & Herbert
Grey Sole	1,200	April 11, 1934	Fulham & Herbert
Grey Sole	5,900	May 4, 1934	Fulham & Herbert

Table 11. — *Articles Which Had Been in Cold Storage Longer Than Twelve Months, and on Which No Requests for Extensions Had Been Made, Ordered Removed, from December 1, 1934, to December 1, 1935.*

Article	Weight (Pounds)	Placed in Storage	Name
Egg Whites	1,830	April 30, 1934	Armour & Co.
Egg Whites	2,580	*Oct. 24, 1934	Armour & Co.
Egg Whites	3,900	*Mar. 15, 1935	Standard Brands, Inc.
Whole Eggs	2,910	*Feb. 23, 1935	Armour & Co.
Whole Eggs	4,500	*Aug. 22, 1935	Armour & Co.
Egg Yolks	390	May 16, 1934	Armour & Co.
Egg Yolks	1,320	*Jan. 29, 1935	Armour & Co.
Chickens	255	Dec. 14, 1933	Swift & Co.
Roasters	175	July 25, 1934	Gloucester National Bank
Turkeys	1,210	*Aug. 13, 1935	Tupman Thurlow Sales Co., Inc.
Beef	4,309	*Aug. 13, 1935	Tupman Thurlow Sales Co., Inc.
Beef	46,350	*June 7, 1935	United Beef Co.
Calves' Livers	1,200	July 26, 1934	Chicago Beef Co.
Calves' Livers	25	July 28, 1934	Chicago Beef Co.
Calves' Livers	1,950	Aug. 4, 1934	Chicago Beef Co.
Calves' Livers	60	July 28, 1934	Kyes Supply Co.
Pork Kidneys	18,350	*Jan. 12, 1935	Armour & Co.
Deer	70	Oct. 27, 1933	Lawrence, W. R.
Venison	120	Nov. 20, 1933	King, S. J.
Venison	40	Oct. 26, 1933	Stoddard, R. W.
Venison	100	Nov. 21, 1932	Wells, L. H.
Venison	139	Nov. 1, 1933	Wells, L. H.
Venison	54	Nov. 28, 1933	Wells, L. H.
Butterfish	734	June 13, 1934	Atlantic Coast Fisheries Corp.
Butterfish	257	June 16, 1934	Busalacchi Bros.
Butterfish	310	June 18, 1934	Star Fish Co.
Halibut Cheeks	450	*Jan. 9, 1935	Chesebro Bros.
Lobster	75	Sept. 1, 1934	Union Lobster Co.
Mackerel	320	May 29, 1934	Caplan's Market
Pulpi	80	July 21, 1934	Atlantic Coast Fisheries Corp.
Pulpi	350	July 21, 1934	Busalacchi, T. & J.
Salmon	424	July 14, 1934	Gloucester Fresh Fish Co.
Scallops	136	May 23, 1934	Fish, Inc.
Scup	185	July 12, 1934	Seaconnet River Fishing Co.
Scup	187	Aug. 9, 1934	Seaconnet River Fishing Co.
Scup	2,371	Aug. 10, 1934	Seaconnet River Fishing Co.
Smelts	150	*Feb. 5, 1935	Morse, D. J.
Smelts	390	*Feb. 5, 1935	Phillips, B. F.
Sole Fillets	24	June 13, 1934	Collins-Lee Co.
Sole, Grey	708	June 23, 1934	Goodspeed, Inc., L. B.
Squid, Bone	504	June 11, 1934	Drape, L. A.
Whiting	90	July 2, 1934	Busalacchi Bros.

* Received frozen and undated.

TABLE 12. — *Articles Other Than Fish Placed in Cold Storage from December 1, 1934, to December 1, 1935*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December . .	398,702	266,055	334,590	298,076	1,260,804	411,889	2,081,838	25,570	369,250	959,731	3,102,097	44,216	1,654,914
January . .	440,960	243,210	309,831	154,624	571,873	299,179	841,988	20,172	89,358	528,434	1,778,055	78,798	1,237,124
February . .	621,645	30,510	795,207	260,108	687,617	613,963	547,617	24,923	94,634	432,870	1,947,882	116,492	1,553,111
March . . .	425,939	887,100	692,397	180,918	215,381	168,984	170,939	10,042	168,260	753,950	859,180	41,769	997,457
April . . .	488,004	2,616,180	678,045	109,598	308,526	138,535	245,940	20,113	237,218	680,780	3,016,551	30,594	730,765
May . . .	983,952	2,109,480	1,125,715	235,284	313,087	143,228	237,154	134,157	190,745	662,483	1,118,779	15,656	1,056,077
June . . .	4,869,364	1,083,480	1,380,252	149,294	203,385	147,471	313,429	299,741	327,307	639,187	620,342	82,725	1,005,176
July . . .	4,945,964	438,360	1,493,178	162,757	166,929	223,818	123,083	275,917	229,734	878,574	935,553	30,707	1,161,530
August . . .	1,539,722	246,750	816,613	97,744	69,278	143,847	311,699	208,363	190,156	481,548	652,421	29,868	1,593,417
September . .	859,073	322,890	766,188	303,210	368,605	255,449	327,938	124,466	232,102	429,296	610,494	93,782	1,138,229
October . .	679,281	349,260	436,575	390,959	436,148	121,999	123,227	41,145	170,623	879,373	912,277	198,333	1,491,556
November . .	792,657	268,950	516,464	311,209	1,190,034	248,351	1,082,030	20,604	368,209	1,275,891	1,250,469	97,315	1,295,503

TABLE 13. — *Articles Other Than Fish on Hand in Cold Storage on the First Day of the Month, from January 1, 1935, through December 1, 1935*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January . .	948,525	737,490	1,936,372	1,890,155	1,854,760	920,962	2,094,117	560,393	737,400	2,965,292	6,534,164	333,786	3,938,748
February . .	759,405	43,770	1,384,738	1,825,676	2,045,577	772,955	2,627,069	408,414	562,222	2,391,944	7,014,254	233,779	2,908,620
March . . .	899,505	20,250	1,283,322	1,592,819	2,151,300	971,484	2,511,169	230,227	364,079	1,855,068	7,458,181	285,195	3,092,274
April . . .	337,604	759,990	1,204,949	1,319,679	1,706,222	429,296	2,253,827	84,254	284,469	1,861,135	7,158,333	262,211	2,601,436
May . . .	202,815	3,244,770	1,132,543	878,776	1,225,658	159,931	1,855,555	38,873	286,847	1,268,156	5,456,626	244,890	2,278,938
June . . .	917,638	5,188,260	1,342,292	594,469	855,932	57,532	1,581,306	138,881	200,674	1,227,636	3,912,011	213,694	1,885,686
July . . .	5,257,373	6,006,420	1,918,135	442,411	571,567	96,978	1,615,118	424,501	299,631	1,142,984	3,341,434	188,055	1,640,745
August . . .	9,519,526	6,011,580	2,649,981	268,987	370,004	142,930	1,370,698	674,724	160,121	1,328,293	2,301,109	166,872	1,531,346
September . .	9,778,615	4,944,990	2,696,035	142,608	116,418	44,522	1,105,789	855,890	113,268	1,213,400	1,799,720	125,620	1,662,424
October . .	8,940,677	3,706,350	2,719,114	347,602	392,527	199,269	914,690	936,118	186,330	1,161,271	1,433,642	158,608	1,610,619
November . .	6,934,426	2,622,090	2,346,740	661,558	747,251	149,252	366,757	847,107	237,007	1,540,944	1,002,730	297,444	1,697,059
December . .	3,860,824	1,599,510	2,121,930	888,119	1,790,955	280,044	934,543	673,830	337,867	2,267,596	1,325,346	323,641	1,274,688

TABLE 14. — *Fish Placed in Cold Storage from December 15, 1934, to December 15, 1935*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscel-laneous Frozen Fish (lbs.)
January . . .	1,250	401	935	–	646,048	39,735	1,095,945	153,896	160,905	88,936	111,325	3,500	26	49,319	25,900	1,754	217,765	565,277
February . . .	2,588	4,673	2,940	–	218,180	15,155	2,215,151	85,432	167,620	43,017	57,163	4,395	–	390,964	32,800	–	249,164	229,920
March . . .	170	7,866	9,388	–	253,630	73,975	1,789,330	82,939	193,365	57,893	25,202	820	75	181,710	58,626	–	588,225	187,083
April . . .	364	–	42,646	1,460	1,001,735	21,430	2,350,912	64,789	104,050	56,545	77,560	13,800	–	6,920	81,005	–	473,108	516,846
May . . .	3,071	105	34,957	6,975	847,739	49,985	3,438,975	31,472	218,900	136,336	91,482	3,360	165	2,969	304,601	–	–	474,711
June . . .	2,832	44,806	65,811	6,800	1,494,227	95,770	3,381,663	77,255	1,105,771	2,864,848	850	7,180	10,620	60	1,625,101	5,905	4,357,972	638,151
July	2,194	42,845	39,179	1,700	1,503,327	24,010	2,370,010	69,509	83,785	2,992,143	29,230	37,005	87,280	1,240	59,928	4,269	5,535,762	597,469
August . . .	15,696	4,615	4,993	3,250	1,856,193	8,145	2,460,678	157,190	181,685	2,744,506	11,880	2,234	12,188	270	304,953	920	1,787,455	1,243,185
September . .	14,416	23,026	2,019	2,800	1,392,491	16,110	2,205,740	27,573	575,326	1,595,222	43,664	1,581	47,933	150	105,106	486	1,337,461	1,446,059
October . . .	4,877	23,591	2,188	–	1,791,665	55,990	2,757,198	55,096	272,483	179,003	11,798	3,985	36,572	965	240,980	–	1,227,511	1,146,700
November . .	6,771	4,369	1,610	500	4,139,533	42,874	1,957,751	101,195	407,210	326,234	31,915	3,857	12,173	6,113	85,090	1,733	1,030,778	1,846,404
December . . .	1,699	5,800	2,050	1,275	2,119,783	22,418	1,822,643	60,726	340,403	51,842	58,567	6,446	735	65,604	31,155	–	1,079,445	1,430,732

TABLE 15. — *Fish on Hand in Cold Storage on the Fifteenth Day of the Month, from January 15, 1935, through December 15, 1935*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscel-laneous Frozen Fish (lbs.)
January . . .	33,085	340,730	2,140	6,830	3,085,760	216,077	3,529,370	276,696	609,112	3,951,134	140,890	11,706	155,562	89,807	546,063	17,077	5,038,143	2,428,286
February . . .	20,507	268,582	2,636	395	1,706,896	198,262	3,996,506	206,004	441,407	2,725,898	135,521	9,729	108,242	412,570	460,421	13,662	3,859,486	1,893,236
March . . .	8,856	180,454	4,753	245	1,002,433	187,182	2,849,118	100,934	339,619	1,539,179	63,681	3,562	87,343	515,943	332,658	8,443	2,393,211	953,501
April . . .	3,599	107,380	34,865	1,460	819,158	100,824	2,074,358	30,532	184,936	205,714	50,047	11,846	78,619	355,087	187,821	–	1,203,421	670,514
May . . .	3,496	57,363	65,783	8,093	997,095	78,430	3,118,808	40,136	259,296	127,567	93,018	7,187	73,694	244,560	404,737	–	159,631	474,489
June . . .	2,674	78,121	121,859	14,110	1,459,742	147,115	3,787,270	90,979	1,122,959	2,946,067	46,558	9,952	79,225	218,679	2,001,899	5,175	3,765,174	633,489
July	1,811	108,097	156,062	14,180	1,867,862	158,215	4,163,520	145,819	971,429	5,744,554	45,747	42,390	138,448	210,187	2,003,105	7,124	8,274,969	881,281
August . . .	15,848	96,088	153,687	16,500	2,647,553	141,782	4,819,041	272,204	805,591	8,176,637	49,574	37,065	139,969	204,287	2,181,023	8,044	8,723,910	1,752,490
September . .	29,554	112,108	91,639	17,151	2,716,759	141,029	3,983,792	285,427	1,127,771	9,516,258	85,446	34,684	174,512	196,813	2,028,018	8,350	7,961,849	2,929,135
October . . .	32,528	124,857	81,427	16,511	2,574,852	176,274	3,972,176	258,897	1,038,080	8,946,878	86,723	34,293	185,059	163,442	1,812,007	8,335	6,647,483	3,022,695
November . .	31,348	103,634	77,002	9,376	4,648,777	173,844	2,832,460	229,530	1,023,514	8,202,692	103,889	32,578	153,497	117,573	1,551,649	8,282	5,194,230	3,471,395
December . . .	23,890	75,697	68,337	8,471	5,106,938	142,131	2,772,618	248,770	962,015	6,505,709	145,216	33,488	101,971	101,723	1,335,128	8,202	4,020,758	3,861,632

Table 16. — *Summary of Slaughtering Inspections from December 1, 1934, through November 30, 1935*

Total number of carcasses inspected	150,821	Total number of carcasses condemned	1,736
Cattle	30,682	Cattle	116
Calves	77,412	Calves	1,208
Hogs	35,238	Hogs	399
Sheep	7,489	Sheep	13

Reasons for Condemnation	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	–	1,074	–	–	1,074
Enteritis	–	1	162	–	163
Tuberculosis	46	8	87	–	141
Died otherwise than by slaughter	1	67	12	1	81
Cholera	–	–	66	–	66
Pneumonia	19	9	19	–	47
Bruised or injured	13	20	7	3	43
Septicemia	12	–	23	1	36
Emaciation	5	6	13	1	25
Abscesses	8	3	3	–	14
Fetus	–	9	–	–	9
Nodular disease	–	–	–	7	7
Slaughtered illegally	–	6	–	–	6
Icterus	1	3	2	–	6
Milk fever	4	–	–	–	4
Peritonitis	1	–	3	–	4
Tumor	2	–	1	–	3
Scours	–	2	–	–	2
Acute inflammation	2	–	–	–	2
Strangulation	1	–	–	–	1
Pleurisy	–	–	1	–	1
Pericarditis	1	–	–	–	1
Totals	116	1,208	399	13	1,736

Table 17. — *Liquor Report for 1935*

Character of Samples

Cities and Towns	Beer	Cider	Wine	Distilled Spirits	Extracts	Alcohol	Miscellaneous	Total
Boston	16	–	–	74	–	37	1	128
Cambridge	3	–	–	10	–	3	–	16
Everett	3	–	2	4	–	1	–	10
Gardner	5	–	–	4	–	2	–	11
Lawrence	7	–	–	8	–	3	2	20
Lowell	2	–	2	16	–	3	–	23
Lynn	–	–	–	13	–	–	–	13
Salem	2	–	1	4	–	6	–	13
Springfield	5	–	–	39	–	17	1	62
Alc. Bev. Con. Com.	13	–	1	90	–	8	–	112
Dept. Public Safety	11	–	–	36	–	1	1	49
*Miscellaneous	25	–	3	52	–	19	2	101
Total	92	–	9	350	–	100	7	558

* From 31 towns submitting less than ten samples each.

REPORT OF THE DIVISION OF SANITARY ENGINEERING

Arthur D. Weston, *Director and Chief Engineer*

Oversight and Care of Inland Waters

During the year 1935 the Division of Sanitary Engineering, which includes the Water and Sewage Laboratories and the Lawrence Experiment Station, investigated 694 applications which required the advice of this Department. Of this number 213 related to municipal water supplies, 153 to semi-public supplies or supplies examined at the request of the local boards of health, 16 to water supplies at schools, 62 to water supplies at camps, 6 to sources of ice supply, 48 to bathing and swimming pools, 10 to shellfish, 7 to pollution of streams, 69 to sewerage and sewage disposal, 22 to Civilian Conservation Corps camps and 88 to miscellaneous matters. The total number of applications received during the year was about 5 per cent in excess of the number received in the year 1934 and the largest number ever received during any calendar year by this Department. Most of these applications required field examinations and analytical work by the Water and Sewage Laboratories and bacterial examinations by the Lawrence Experiment Station, and many of the applications required field examinations by the chemists and some required special research laboratory work.

WATER SUPPLIES

Examination of Public Water Supplies

Public water supplies during the year 1935 were introduced in the towns of Georgetown and Sterling, thus increasing the number of cities and towns having public water supplies to 243. This number includes several smaller towns supplied only in part by water companies, industrial plants and by other towns. In addition, contracts were awarded for the introduction of water supplies in the towns of Bernardston, North Reading, Sudbury and West Newbury and in other municipalities, considerable improvements were made to existing works, a number of treatment plants were completed during the year and plans were undertaken at the end of the year for additional treatment works.

The following table summarizes the major additions and improvements made in connection with the public water supplies in the State during the year 1935:

New Water Supplies:

Georgetown	Tubular wells — Iron removal plant.
Sterling	Tubular wells.
Bernardston	Contract awarded — Tubular wells.
North Reading	Contract awarded — To purchase water from Wilmington.
Sudbury	Contract awarded — Tubular wells.
West Newbury	Contract awarded — To purchase supply.

Additions to Existing Supplies:

Attleboro	Gravel-packed wells near Wading River (completed).
Dedham Water Company	Tubular wells (temporary supply).
Deerfield Fire District	Infiltration drain (completed).
Dracut	Tubular wells (completed). Additional test wells (under construction).
Great Barrington Fire District	Infiltration gallery (completed).
Lancaster	Tubular wells (investigation made).
Lowell	Gravel-packed wells (completed).
Needham	Tubular wells (appropriations made).
Pittsfield	New impounding reservoir (contract awarded).
Tisbury	Infiltration gallery (plans prepared).
Wareham	Tubular wells (completed).
Woburn	Gravel-packed wells (bids received).

Treatment Works Completed or Under Way:

Athol	Rapid sand filters (plans approved).
Cohasset	Iron removal plant (plans for remodeling approved).
Georgetown	Iron removal plant (completed).
Greenfield	Modified slow sand filters (completed).
Leominster	Rapid sand filters (under construction).
Northborough	Modified slow sand filters (contract awarded).
Norwood	Iron removal plant (under construction).
Randolph and Holbrook	Rapid sand filters (under construction).
Reading	Iron removal plant (under construction).
Salem and Beverly	Rapid sand filters (completed).
Weymouth	Rapid sand filters (completed).

Chlorinators:

Amesbury
Clinton
Franklin
Gloucester
Lynn
Salem and Beverly
Winchester

Chemical Treatment for Corrosiveness.

Canton
Needham
Ware
Wellesley

Water Supply Statistics

The following tables are arranged to show the various cities and towns in the Commonwealth and the character of the works of those that are now supplied wholly or in part with water from public works, the total assessed estate valuation of the municipalities, and kind of treatment where purification works have been provided.

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935)		Treatment
						Number	Per Cent Metered	
Abington	1887	Big Sandy Bottom Pond	$5,550,681	5,696	P.	1,495	97	Chlorination
Acton	–		3,772,838	2,635	–	–	8	– – –
West and South Water Supply District	1912	Tubular Wells	–	–	P.	568	84	– – –
Acushnet Fire and Water District	1916	New Bedford Water Supply	3,400,062	3,951	–	637	100	– – –
Adams	–		10,628,300	12,858	–	–	–	– – –
Adams Fire District	1874	Dry Brook Reservoir	–	–	G.	2,290	3	Chlorination
		Bassett Brook Reservoir	–	–	G.	–	–	– – –
		Tubular Wells	–	–	P.	–	–	– – –
Agawam	1877	Springfield Water Supply	9,127,908	7,206	–	1,500	97	
Alford	——		274,541	210	–	–	–	– – –
Amesbury	1885	Tubular Wells	9,105,785	10,514	P.	2,120	20	Iron Removal — Chlorination, Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration
Amherst	–		9,204,989	6,473	–	–	–	– – –
Amherst Water Co.	1880	Reservoirs on Amethyst Brook	–	–	G.	1,492	98	Chlorination
		Atkins Pond	–	–	P.	–	–	Chlorination
Andover	1890	Haggett's Pond	16,192,060	10,542	P.	2,502	95	Chlorination
Arlington	1872	Metropolitan Water Supply	59,643,550	38,539	–	7,391	100	– – –
Ashburnham	1870	Upper Naukeag Lake	1,543,065	2,051	P.	–	–	Chlorination
Ashby	——		1,008,088	957	–	–	–	– – –
Ashfield	–		1,092,580	918	–	–	–	– – –
Ashfield Water Co.	1904	Highland Spring Reservoir	–	–	G.	92	0	– – –
Ashland	1911	Tubular Wells	2,614,810	2,497	P.	409	100	– – –
Athol	1875	Phillipston Reservoir	10,708,090	10,751	G.	1,895	97	Coagulation, Rapid Sand Filtration (Pressure Filter)
		Thousand Acre Meadow Brook Reservoir	–	–	G.	–	–	Slow Sand Filtration
		Newton Reservoir	–	–	G.	–	–	Slow Sand Filtration
		Lake Ellis (Emergency)	–	–	P.	–	–	– – –
ATTLEBORO	1873	Dug Wells and Filter Gallery	25,281,165	21,835	P.	4,090	91	– – –
		Tubular Wells	–	–	P.	–	–	– – –
		Gravel Packed Wells	–	–	P.	–	–	– – –
Auburn	–		5,983,000	6,535	–	–	–	– – –
Auburn Water Co.	1920	Dug and Tubular Wells	–	–	P.	513	–	– – –
Woodland Park Water District	1935	Worcester Water Supply	–	–	–	–	–	– – –
Avon	1890	Dug and Tubular Wells	1,763,100	2,362	P.	572	69	– – –
Ayer	1887	Dug and Tubular Wells	3,586,900	3,861	P.	750	81	– – –

Barnstable	—		23,605,030	8,037	—	—	—	— — —
Barnstable Water Co. (Hyannis)	1912	Tubular Wells	—	—	P.	1,440	5	. . .
Barnstable Fire Dist. (Barnstable and W. Barnstable)	1934	Yarmouth Water Supply	—	—	—	73	100	— — —
Barre	1895	Reservoir on Allen Hill	2,788,488	3,509	G.	225	3	— — —
Becket	—		846,857	723	—	—	—	— — —
Bedford	1909	Dug and Tubular Wells	2,883,450	3,185	P.	425	80	— — —
Belchertown	—		1,446,375	3,863	—	—	—	— — —
Belchertown Water District	1925	Tubular Wells	—	—	P.	160	94	— — —
Bellingham	—		2,322,037	3,056	—	—	—	— — —
Belmont	1887	Metropolitan Water Supply	49,352,400	24,831	—	4,818	100	— — —
Berkley	—		855,681	1,156	—	—	—	— — —
Berlin	—		1,059,145	1,091	—	—	—	— — —
Bernardston	—		827,015	975	—	—	—	— — —
Bernardston Fire and Water District	1935	Greenfield Water Supply	—	—	—	—	—	— — —
Beverly	1868	Wenham Lake	42,878,200	25,871	P.	5,715	92	Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
		Longham Reservoir	—	—	P.	—	—	Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
		Ipswich River	—	—	P.	—	—	Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
Billerica (Town Supply)	1898	Gravel Packed Wells	8,968,613	6,650	P.	1,085	100	Iron Removal — Aeration, Sedimentation, Chlorination
Nuttings Lake Water Co.	1915	Dug and Tubular Wells	—	—	P.	—	—	— — —
Blackstone	1911	Woonsocket, R. I., Water Supply	2,279,042	4,588	—	—	—	— — —
Blandford	—		798,944	469	—	—	—	— — —
Blandford Fire District	1909	Freeland Brook Reservoirs	—	—	P.	113	100	— — —
Bolton	—		1,107,777	739	—	—	—	— — —
Boston	1848	Metropolitan Water Supply	1,650,000,000	817,713		101,566	100	— — —
Bourne	—		9,482,000	3,336	—	—	—	— — —
Monument Beach Water Co.	1916	Tubular Wells	—	—	P.	109	0	— — —
Pocasset — Pocasset Cooperative Water Co.	1923	Tubular Wells	—	—	P.	42	—	— — —
Pocasset — North Shore Supply	1926	Tubular Wells	—	—	P.	32	0	— — —
Sagamore — Ware Tenement Supply	1914	Tubular Wells	—	—	P.	65	0	— — —
Keith Block Supply	1914	Tubular Wells	—	—	P.	—	—	— — —
Knowlton Property Supply	1909	Tubular Wells	—	—	P.	—	—	— — —
Savery Avenue Supply	1923	Tubular Wells	—	—	P.	17	—	— — —
Sagamore Beach Development Co.	—	Tubular Wells	—	—	P.	—	—	— — —
Sagamore Heights Supply	—	Tubular Wells	—	—	P.	12	0	— — —
Boxborough	—		391,781	404	—	—	—	— — —
Boxford	—		1,153,696	726	—	—	—	— — —
Boylston	—		932,295	1,361	—	—	—	— — —
Braintree	1887	Great Pond	25,651,150	17,122	P.	4,300	92	Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
Brewster	—		2,159,196	715	—	—	—	— — —
Bridgewater	1888	Tubular Wells	5,116,225	9,201	P.	1,135	100	— — —
Brimfield	—		933,530	892	—	—	—	— — —
Public Buildings Supply	—	Springs	—	—	G.	—	—	— — —
Brockton	1880	Silver Lake	75,268,800	62,407	P.	11,965	96	— — —
		Avon Reservoir (Emergency)	—	—	P.	—	—	— — —
Brookfield	1889	Cooley Hill Reservoir	1,270,690	1,309	G.	—	—	— — —
		Dug and Tubular Wells	—	—	P.	—	—	Chlorination

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935) Number	Services (1935) Per Cent Metered	Treatment
Brookline	1875	Tubular Wells	$160,726,100	50,319	P.	8,008	100	Iron Removal, Aeration, Coke, Filtration, Sedimentation, Slow Sand Filtration
Buckland	—		2,591,985	1,540	–	–	–	– – –
Burlington	—		2,352,367	2,146	–	–	–	– – –
CAMBRIDGE	1856	Stony Brook Reservoir	180,616,500	118,075	P.	13,978	98	Coagulation, Sedimentation, Rapid Sand Filtration, Aeration, Chlorination
		Hobbs Brook Reservoirs	–	–	P.	–	–	Coagulation, Sedimentation, Rapid Sand Filtration, Aeration Chlorination
		Fresh Pond	–	–	P.	–	–	Coagulation, Sedimentation, Rapid Sand Filtration, Aeration, Chlorination
Canton	1889	Dug and Tubular Wells	8,349,610	6,505	P.	1,377	99	Chlorination, Corrosive Correction
Carlisle	—		1,067,928	688	–	–	–	– – –
Carver	—		2,946,850	1,559	–	–	–	– – –
Charlemont	–		985,402	923	–	–	–	– – –
Mine Brook Supply	1889	Mine Brook	–	–	G.	–	–	– – –
Charlton	—		1,781,800	2,366	–	–	–	– – –
Chatham	–		5,718,440	2,050	–	–	–	– – –
Chatham Water Co.	1929	Tubular Wells	–	–	P.	460	49	– – –
		Filter Gallery at White Pond (Emergency)	–	–	P.	–	–	– – –
Chelmsford	–		6,669,706	7,595	–	–	–	– – –
N. Chelmsford Fire District	1907	Tubular Wells	–	–	P.	460	100	– – –
Chelmsford Water District	1914	Tubular Wells	–	–	P.	725	88	– – –
E. Chelmsford Water District	1934	Lowell Water Supply	–	–	–	–	–	– – –
CHELSEA	1867	Metropolitan Water Supply	46,762,050	42,673	–	5,808	100	– – –
Cheshire	–		1,162,765	1,660	–	–	–	– – –
Cheshire Water Co.	1876	Kitchen Brook Reservoir	–	–	G.	195	–	– – –
		Thunder Brook Reservoir (Emergency)	–	–	G.	–	–	– – –
Chester	1893	Austin Brook Reservoir	1,256,030	1,362	G.	–	–	– – –
		Horn Pond	–	–	G.	–	–	– – –
Chesterfield	—		549,380	445	–	–	–	– – –
CHICOPEE	1845	Morton Brook Reservoir	42,152,900	41,952	P.	6,208	98	Chlorination
		Cooley Brook Reservoir	–	–	P.	–	–	Aeration, Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
Chilmark	—		673,073	253	–	–	–	– – –
Clarksburg	—		705,586	1,333	–	–	–	– – –

Clinton	1882	Upper, Lower Lynde's Reservoirs	11,571,378	12,373	G.	2,204	98	Chlorination
		Spring Basin	–	–	G.	–	–	Chlorination
		Heywood Pond	–	–	G.	–	–	Chlorination
		Wachusett Reservoir (Emergency)	–	–	P.	–	–	– – –
Cohasset	–		10,287,667	3,418	–	–	–	– – –
Cohasset Water Co.	1886	Tubular Wells (Emergency)	–	–	P.	999	5	Chlorination
		Lily Pond (Preliminary Filtration)	–	–	P.	–	–	Aeration with Coke, Coagulation, Sedimentation, Rapid Sand Filtration
	.	Dug Well	–	–	P.	–	–	Aeration with Coke, Coagulation, Sedimentation, Rapid Sand Filtration
Colrain	–		1,234,865	1,554	–	–	–	– – –
Colrain Fire District No. 1	1902	Mountain Brook Reservoir	–	–	G.	–	–	– – –
Griswoldville Mfg. Co. (Griswoldville)	1901	McClellan Brook Reservoir	–	–	G.	–	–	– – –
		Tubular Well	–	–	P.	–	–	Chlorination
Griswoldville Mfg. Co. (Lyonsville)	——	Springs and Tubular Well	–	–	P.	–	–	– – –
Concord	1873	Sandy Pond	9,733,135	7,723	G.	1,668	18	– – –
		Nagog Pond	–	–	G.	–	–	– – –
Conway	——		886,570	952	–	–	–	– – –
Cummington	1916	Tubular Wells and Spring	493,245	610	P.	–	–	– – –
Dalton	–		5,777,444	4,282	–	–	–	– – –
Dalton Fire District	1884	Beals Brook Reservoir	–	–	G.	1,109	0	– – –
		Egypt Brook Reservoir	–	–	G.	–	–	– – –
		Cady Brook Reservoir	–	–	G.	–	–	– – –
		May Brook Reservoir	–	–	G.	–	–	– – –
		Anthony Brook Reservoir	–	–	G.	–	–	– – –
		Windsor Reservoir (Emergency)	–	–	G.	–	–	– – –
Dana	——		496,841	387	–	–	–	– – –
Danvers	1876	Middleton Pond	11,821,900	13,884	P.	3,043	62	Chlorination
		Swan Pond	–	–	P.	–	–	Chlorination
Dartmouth	1915	New Bedford Water Supply	11,636,025	9,424	G.	1,325	100	– – –
Salters Point	1899	Dug Wells	–	–	P.	–	–	– – –
Bay View Supply	——	Tubular Well	–	–	P.	–	–	– – –
Dedham	–		25,202,650	15,371	–	–	–	– – –
Dedham Water Co.	1881	Dug and Tubular Wells	–	–	P.	3,782	98	– – –
		Tubular Wells (Emergency)	–	–	P.	–	–	– – –
Deerfield	–		4,065,589	2,963	–	–	–	– – –
S. Deerfield Water Supply District	1903	Roaring Brook Reservoir	–	–	G.	–	–	Chlorination (Seasonal)
Deerfield Fire District	1911	Dug and Tubular Wells	–	–	P.	150	100	– – –
		Springs	–	–	G.	–	–	– – –
Dennis	——		3,653,175	2,017	–	–	–	– – –
Dighton	——		3,302,215	3,116	–	–	–	– – –
Douglas	1910	Tubular Wells	1,822,488	2,403	P.	260	64	– – –
Dover	——		3,901,270	1,305	–	–	–	– – –
Public Bldg. Supply	1927	Tubular Wells	–	–	P.	–	–	– – –
Dracut	–		4,020,595	6,500	–	–	–	– – –
Dracut Water Supply District	1900	Tubular Wells	–	–	P.	926	90	Chlorination
Dudley	1910	Tubular Wells	3,085,100	4,568	P.	451	100	– – –
Dunstable	1918	Dug and Tubular Wells	460,275	419	P.	20	90	– – –
Duxbury	–		7,144,982	2,244	–	–	–	– – –
Duxbury Fire and Water District	1914	Tubular Wells	–	–	P.	899	100	– – –
East Bridgewater	1888	Brockton Water Supply	4,566,083	3,670	–	920	95	– – –
East Brookfield	1921	Tubular and Dug Wells	1,132,220	945	P.	157	80	– – –

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935)		Treatment
						Number	Per Cent Metered	
Eastham	—		$1,256,190	606	–	–	–	– – –
Easthampton	1870	Tubular Wells	10,522,696	10,486	P.	1,575	100	– – –
East Longmeadow	1913	Springfield Water Supply	3,791,955	3,375	–	590	97	– – –
Easton	–		5,090,555	5,294	–	–	–	– – –
N. Easton Village District	1887	Reservoir near Queset River	–	–	P.	670	100	Coke Filtration
		Lincoln Spring	–	–	P.	–	–	– – –
		Dug Well	–	–	P.	–	–	– – –
Unionville Fire and Water District	1916	N. Easton Village District Water Supply	–	–	–	–	–	– – –
S. Easton and Eastondale Fire and Water District	1915	Brockton Water Supply	–	–	–	–	–	– – –
Edgartown	–		4,014,485	1,399	–	–	–	– – –
Edgartown Water Co.	1906	Dug and Tubular Wells	–	–	P.	631	2	– – –
Egremont	–		916,821	569	–	–	–	– – –
S. Egremont Water Co.	1913	Goodale Brook Reservoir	–	–	G.	98	7	Chlorination (Seasonal)
Enfield	—		534,760	495	–	–	–	– – –
Erving	–		1,932,507	1,283	–	–	–	– – –
Millers Falls Fire and Water District	1896	See Montague	–	–	–	–	–	– – –
ESSEX	—		1,697,030	1,486	–	–	–	– – –
EVERETT	1867	Metropolitan Water Supply	75,015,300	47,228	–	7,408	100	– – –
Fairhaven	–		11,288,220	11,005	–	–	–	– – –
Fairhaven Water Co.	1894	Tubular Wells	–	–	P.	2,434	–	– – –
FALL RIVER	1874	North Watuppa Pond	106,130,050	117,414	P.	13,059	99	Chlorination
Falmouth	1899	Long Pond	21,805,224	6,537	P.	3,028	23	Corrosive Correction
FITCHBURG	1872	Meetinghouse Pond	50,967,575	41,700	G.	7,177	86	– – –
		Wachusett Lake	–	–	G.	–	–	– – –
		Ashby Reservoir	–	–	G.	–	–	– – –
		Scott Reservoir	–	–	G.	–	–	– – –
		Falulah Reservoir	–	–	G.	–	–	– – –
		Lovell Reservoir	–	–	G.	–	–	– – –
Florida	—		1,397,762	405	–	–	–	– – –
Foxborough	1891	Tubular Wells	5,525,705	5,834	P.	–	–	– – –
Framingham	1885	Sudbury Aqueduct Supply	33,846,770	22,651	P.	4,245	100	Chlorination
		Filter Galleries (Emergency)	–	–	P.	–	–	Chlorination
Franklin	1884	Tubular Wells	8,724,700	7,494	P.	1,409	97	Chlorination (Emergency)
Freetown	—		1,421,455	1,813	–	–	–	– – –
GARDNER	1882	Crystal Lake	21,535,191	20,397	P.	2,930	100	Chlorination
		Perley Brook	–	–	P.	–	–	Chlorination
Gay Head	—		147,815	158	–	–	–	– – –
Georgetown	1935	Tubular Wells	1,667,268	2,009	P.	103	14	Iron Removal — Aeration, Coke Filtration
Gill	–		831,756	995	–	–	–	– – –
Riverside Water Co.	1888	Heal All Spring	–	–	G.	74	0	– – –

GLOUCESTER	1885	Wallace Brook Reservoir	39,006,360	24,164	P.	6,246	16	– – –
		Haskell Brook Reservoir	–	–	P.	–	–	– – –
		Dike's Brook Reservoir	–	–	P.	–	–	Chlorination
		Babson Reservoir	–	–	P.	–	–	Chlorination
Goshen	——		358,990	257	–	–	–	– – –
Gosnold	——		1,324,205	129	–	–	–	– – –
Grafton	–		4,157,009	7,681	–	–	–	– – –
Grafton Water Co.	1886	Dug and Tubular Wells	–	–	P.	478	22	– – –
Saunders Cotton Mill — Saundersville	1838	Dug and Tubular Wells	–	–	P. and G.	56	0	– – –
Granby	——		935,500	956	–	–	–	– – –
Granville	–		1,773,114	704	–	–	–	– – –
Granville Center Water Co.	1910	Dug Well and Springs	–	–	G.	20	95	– – –
Great Barrington	–		8,610,380	6,369	–	–	–	– – –
Great Barrington Fire District	1867	East Mountain Reservoir	–	–	G.	1,230	3	– – –
		Infiltration Gallery near Green River	–	–	P.	–	–	– – –
		Lake Mansfield (Emergency)	–	–	G.	–	–	– – –
Housatonic Water Works Co.	1888	Long Pond	–	–	G.	606	0	– – –
Greenfield	1870	2 Reservoirs on Glen Brook	24,512,400	15,903	P.	3,500	86	Coagulation, Sedimentation, Slow Sand Filtration, Chlorination
		Filter Gallery near Green River	–	–	P.	–	–	Coagulation, Sedimentation, Slow Sand Filtration, Chlorination
Greenwich	——		337,081	219	–	–	–	– – –
Groton	–		3,829,279	2,534	–	–	–	– – –
Groton Water Co.	1897	Dug Well	–	–	P.	370	100	– – –
W. Groton Water Supply District	1912	Tubular Wells	–	–	P.	162	4	– – –
Groveland	1915	Haverhill Water Supply	1,577,291	2,219	–	548	57	– – –
Hadley	–		2,929,038	2,711	–	–	–	– – –
Hadley Water Supply District	1905	2 Reservoirs on Harts Brook	–	–	G.	320	0	– – –
Halifax	——		1,433,616	817	–	–	–	– – –
Hamilton	——		5,725,581	2,235	–	–	–	– – –
Hampden	——		657,331	854	–	–	–	– – –
Hancock	——		429,664	408	–	–	–	– – –
Hanover	1930	Tubular Wells	3,538,645	2,709	P.	487	2	– – –
Hanson	1920	Supplied by Brockton, Rockland and	2,666,739	2,417	–	–	–	– – –
	1930	Hanover connections in 1930	–	–	–	–	–	– – –
Hardwick	–		1,800,128	2,379	–	–	–	– – –
Hardwick Center	1913	Dug Well	–	–	G.	–	–	– – –
Wheelwright	1904	Tubular Wells	–	–	P.	–	–	– – –
G. H. Gilbert Mfg. Co.	1887	Dug and Tubular Wells	–	–	P.	–	–	– – –
Harvard	——		2,141,610	952	–	–	–	– – –
Harwich	——		6,089,200	2,373	–	–	–	– – –
Hatfield	1896	Running Gutter Brook Reservoir	2,578,970	2,433	G.	450	0	– – –
HAVERHILL	1802	Millvale Reservoir	54,329,950	49,516	P.	9,094	86	Chlorination
		Kenoza Lake	–	–	P.	–	–	Chlorination
		Crystal Lake	–	–	G.	–	–	Chlorination
		Round Pond	–	–	G.	–	–	Chlorination
		Johnson's Pond	–	–	P.	–	–	Chlorination
		Chadwick Pond	–	–	P.	–	–	Chlorination
Hawley	——		228,525	308	–	–	–	– – –
Heath	——		374,677	368	–	–	–	– – –
Hingham	–		15,301,885	7,330	–	–	–	– – –
Hingham Water Co.	1880	Accord Pond	–	–	G.	5,863	38	Chlorination
		Collecting System at Fulling Mill Pond	–	–	P.	–	–	Corrosive Correction

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935)		Treatment
						Number	Per Cent Metered	
Hinsdale	–		$999,790	1,144	–	–	–	– – –
Hinsdale Fire District	1889	Belmont Reservoir on Steam Sawmill Brook	–	–	G.	–	–	– – –
Holbrook	1888	See Randolph	3,088,714	3,364	P.	–	–	– – –
Holden	1905	Muschopauge Pond	3,209,434	3,914	G.	674	99	Chlorination
Holland	—		229,420	201	–	–	–	– – –
Holliston	–		3,615,019	2,925	–	–	–	– – –
Holliston Water Co.	1891	Dug Well and Filter Basin	–	–	P.	404	1	Chlorination
		Tubular Wells	–	–	P.	–	–	– – –
HOLYOKE	1873	Wright and Ashley Ponds	84,471,330	56,139	G.	6,137	8	– – –
		Hugh McLean Reservoir (High Service)	–	–	G.	–	–	– – –
		Lower Whiting Street Reservoir	–	–	G.	–	–	– – –
		Upper Whiting Street Reservoir	–	–	G.	–	–	– – –
		Carmody Reservoir (Fomer)	–	–	G.	–	–	– – –
		White Reservoir	–	–	G.	–	–	– – –
Hopedale	1881	See Milford	4,583,816	3,068	–	–	–	– – –
Hopkinton	1884	Tubular Wells	2,819,400	2,616	P.	–	–	– – –
Hubbardston	—		844,545	1,000	–	–	–	– – –
Hudson	1884	Gates Pond	6,850,481	8,495	G.	1,631	100	– – –
		Fosgate Brook	–	–	G.	–	–	– – –
Hull	1882	See Hingham	17,951,520	2,619	–	–	–	– – –
Huntington	–		1,020,255	1,345	–	–	–	– – –
Huntington Fire District	1899	Cold Brook Reservoir	–	–	G.	–	–	– – –
		Tubular Wells	–	–	P.	–	–	– – –
Ipswich	1894	Dow's Brook Reservoir	6,951,868	6,217	P.	1,642	91	Chlorination
		Bull Brook Reservoir	–	–	P.	–	–	Chlorination
Kingston	1886	Tubular Wells	4,383,449	2,743	P.	843	0	– – –
Lakeville	—		1,417,481	1,443	–	–	–	– – –
Lancaster	1885	Clinton Water Supply	2,812,584	2,590	–	586	93	– – –
Lanesborough	—		1,174,393	1,237	–	–	–	– – –
LAWRENCE	1875	Merrimack River	98,788,725	86,785	P.	10,516	98	Slow Sand Filtration, Chlorination
Lee	–		4,520,957	4,178	–	–	–	– – –
Berkshire Water Co.	1881	Basin Pond Brook Reservoir	–	–	G.	880	1	Chlorination
		Codding Brook Reservoir (Upper)	–	–	G.	–	–	Chlorination
		Codding Brook Reservoir (Lower)	–	–	G.	–	–	Chlorination
		Venetti Reservoir	–	–	G.	–	–	Chlorination
Leicester	–		3,160,575	4,426	–	–	–	– – –
Leicester W. S. District	1891	Dug and Tubular Wells	–	–	G.	–	–	– – –
Cherry Valley and Rochdale Water District	1911	Dug Wells	–	–	P.	560	42	– – –
Lenox	–		5,977,819	2,706	–	–	–	– – –
Lenox Water Co.	1875	Lower and Upper Root Reservoirs	–	–	G.	354	100	Chlorination (Seasonal)
		Woolsey Reservoir and Ravine Reservoir	–	–	G.	–	–	– – –

Leominster	1873	Haynes Reservoir	22,492,140	21,894	G.	3,650	99	Chlorination
		Morse Reservoir	–	–	G.	–	–	Chlorination
		Distributing Reservoir	–	–	G.	–	–	Chlorination
		Fall Brook Reservoir	–	–	G.	–	–	Chlorination
		No-Town Reservoir	–	–	G.	–	–	Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
Leverett	—		462,670	726	–	–	–	– – –
Lexington	1884	Metropolitan Water Supply	21,592,437	10,813	–	2,531	100	– – –
Leyden	—		276,319	253	–	–	–	– – –
Lincoln	1874	Sandy Pond	3,083,885	1,573	P.	438	3	– – –
Littleton	1912	Tubular Wells	2,833,750	1,530	P.	335	100	– – –
Longmeadow	1895	Springfield Water Supply	11,436,602	5,105	–	1,330	100	– – –
Lowell	1872	Tubular Wells	110,340,750	100,114	P.	16,750	90	Iron Removal — Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration, Chlorination (Seasonal)
		Gravel Packed Wells	–	–	–	–	–	– – –
Ludlow	–		8,423,588	8,569	–	–	–	– – –
Ludlow Mfg. Co.	1873	Springfield Water Supply (Ludlow Reservoir)	–	–	–	841	100	– – –
Lunenberg	—		2,263,279	2,124	–	–	–	– – –
Lynn	1871	Hawkes Pond	137,533,010	100,909	P.	17,850	82	Chlorination
		Breeds Pond	–	–	P.	–	–	Chlorination
		Walden Pond	–	–	P.	–	–	Chlorination
		Birch Pond	–	–	P.	–	–	Chlorination
		Ipswich River	–	–	P.	–	–	Chlorination
Lynnfield	–		3,715,176	1,896	–	–	–	– – –
Lynnfield Water District	1926	Lynn Water Supply	–	–	–	200	100	– – –
Lynnfield Center (Pitman)	—	Dug Well	–	–	P.	–	–	– – –
Malden	1870	Metropolitan Water Supply	70,242,975	57,277	–	9,766	100	– – –
Manchester	1892	Gravel Pond	11,420,865	2,509	P.	1,129	98	– – –
		Tubular and Dug Wells	–	–	P.	–	–	– – –
Mansfield	1888	Dug Well	7,365,740	6,543	P.	1,400	86	– – –
Marblehead	1885	Tubular and Dug Wells	20,195,910	10,173	P.	2,831	72	Iron Removal — Aeration, Sedimentation, Slow Sand Filtration
Marion	1908	Tubular Wells	5,187,626	1,867	P.	747	66	– – –
Marlborough	1883	Lake Williams	16,032,931	15,781	P.	2,883	90	Chlorination
		Millham Brook Reservoir	–	–	P.	–	–	Chlorination
Marshfield	1928	Tubular Wells	7,573,075	2,073	P.	1,800	0	– – –
Marshfield (Humarock Beach)	—	Tubular Wells	–	–	P.	–	–	– – –
Mashpee	—		906,670	380	–	–	–	– – –
Mattapoisett	1913	Tubular Wells	3,480,925	1,682	P.	500	14	– – –
Maynard	1889	White Pond	6,149,705	7,107	P.	1,487	98	Chlorination
Medfield	1889	Medfield State Hospital Supply	2,732,399	4,162	P.	354	100	– – –
		Tubular Wells	–	–	–	–	–	– – –
Medford	1870	Metropolitan Water Supply	80,823,250	61,444	–	10,691	100	– – –
Medway	1911	Tubular Wells	3,182,085	3,268	P.	700	50	Chlorination
Melrose	1870	Metropolitan Water Supply	36,862,400	24,256	–	6,038	100	– – –
Mendon	—		1,336,500	1,265	–	–	–	– – –
Merrimac	1904	Tubular Wells	1,756,750	2,209	P.	688	5	– – –
Methuen	1875	Tubular Wells	18,155,290	21,073	P.	4,109	90	Chlorination

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935)		Treatment
						Number	Per Cent Metered	
Metropolitan Water Supply*	1895	Wachusett Reservoir	–	–	G.	–	–	Chlorination
		Sudbury Reservoir	–	–	G.	–	–	Chlorination
		Framingham Reservoir No. 1	–	–	G.	–	–	Chlorination
		Framingham Reservoir No. 2	–	–	G.	–	–	Chlorination
		Framingham Reservoir No. 3	–	–	G.	–	–	Chlorination
		Whitehall Reservoir	–	–	G.	–	–	Chlorination
		Hopkinton Reservoir	–	–	G.	–	–	Chlorination
		Ashland Reservoir	–	–	G.	–	–	Chlorination
		Ware River (1931)	–	–	G.	–	–	Chlorination
		Lake Cochituate (Emergency)	–	–	G.	–	–	Chlorination
		Farm Pond (Emergency)	–	–	G.	–	–	Chlorination
Middleborough	1885	Dug Well	$8,001,365	8,865	P.	1,349	98	Iron Removal — Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration
Middlefield	—	. . .	315,698	220	–	–	–	. . .
Middleton	1876	See Danvers	1,955,929	1,975	P.	–	–	– – –
Milford	–	. . .	14,538,475	15,008	–	–	–	– – –
Milford Water Co.	1881	Dug Wells	–	–	P.	3,085	100	Slow Sand Filtration, Corrosive Correction, Chlorination
		Charles River	–	–	P.	–	–	Slow Sand Filtration, Corrosive, Correction, Chlorination
Millbury	–	. . .	5,715,268	6,879	–	–	–	– – –
Millbury Water Co.	1895	Dug Well	–	–	P.	939	–	– – –
Maple Hillside Water Co.	1925	Worcester Water Supply	–	–	–	51	–	– – –
Millis	1891	Dug Wells	3,021,835	2,098	P.	–	–	– – –
Millville	—	. . .	1,134,767	1,901	–	–	–	– – –
Milton	1885	Metropolitan Water Supply	37,784,350	18,147	–	4,225	100	– – –
Monroe	–	. . .	947,814	240	–	–	–	– – –
Monroe Water District	—	Phelps Brook Reservoir and Springs	–	–	G.	–	–	– – –
Monson	1895	Dug Wells and Ingalls' Brook	2,860,874	5,193	G.	572	95	– – –
		Conant Brook Reservoir (Emergency)	–	–	G.	–	–	– – –
Montague	–	. . .	10,411,265	7,967	–	–	–	– – –
Turners Falls Fire District	1887	Lake Pleasant	–	–	P.	878	5	– – –
Millers Falls Fire and Water District	1886	Turners Falls Fire District	–	–	P.	–	–	– – –
Lake Pleasant W. S. District	1909	Turners Falls Fire District	–	–	P.	–	–	– – –
Montague Village (E. L. Bartlett)	1911	Springs	–	–	P.	90	0	– – –
Monterey	–	. . .	840,644	325	–	–	–	– – –
Monterey Water Co.	1917	Reservoir on Brook	–	–	G.	34	0	– – –
Montgomery	—	. . .	232,541	174	–	–	–	– – –
Mount Washington	—	. . .	210,867	64	–	–	–	– – –
Nahant	1885	Metropolitan Water Supply	5,863,204	1,748	–	919	100	– – –
Nantucket	–	. . .	12,053,030	3,495	–	–	–	– – –
Siasconset (Town)	1913	Dug Wells	–	–	P.	342	1	– – –
Wannacomet Water Co.	1878	Tubular and Dug Wells	–	–	P.	1,868	0	– – –
		Wannacomet Pond (Emergency)	–	–	P.	–	–	– – –

Natick	1874	Dug Well	18,970,575	14,394	P.	3,526	100	– – –
Needham	1890	Dug and Tubular Wells	22,687,750	11,828	P.	2,998	100	Corrosive Correction, Chlorination
		Hicks Spring	–	–	P.	–	–	– – –
New Ashford	—		134,362	94	–	–	–	– – –
NEW BEDFORD	1869	Great Quittacas Pond	177,715,425	110,022	P.	17,590	99	– – –
		Little Quittacas Pond	–	–	P.	–	–	– – –
New Braintree	—		529,945	436	–	–	–	– – –
Newbury	—		2,104,421	1,576	–	–	–	– – –
NEWBURYPORT	1881	Upper and Lower Artichoke Reservoirs	12,735,060	14,815	P.	4,200	3	Slow Sand Filtration
		Dug and Tubular Wells, Springs	–	–	P.	–	–	– – –
New Marlborough	—		1,365,283	921	–	–	–	– – –
Mill River Water Supply Co.	—	Spring	–	–	G.	–	–	– – –
Southfield Water Trust	1870	Springs	–	–	G.	–	–	– – –
Southfield — H. A. Cook	1913	Springs	–	–	G.	–	–	– – –
New Salem	—		464,918	443	–	–	–	– – –
NEWTON	1876	Dug Wells	164,422,850	66,144	P.	15,114	100	Corrosive Correction, Chlorination
		Filter Gallery	–	–	P.	–	–	Corrosive Correction, Chlorination
Norfolk	—		1,576,464	2,073	–	–	–	– – –
NORTH ADAMS	1861	Notch Brook Reservoir	22,858,290	22,085	G.	3,394	100	– – –
		Mount Williams Reservoir	–	–	G.	–	–	– – –
		Broad Brook Reservoir	–	–	G.	–	–	Chlorination
		James Brook Reservoir	–	–	G.	–	–	Chlorination
		Tubular Wells (Emergency)	–	–	P.	–	–	Chlorination
NORTHAMPTON	1871	Mountain Street Reservoir	26,367,800	24,525	G.	4,350	100	– – –
		Avery Brook Reservoir	–	–	G.	–	–	– – –
		Roberts Reservoir (Emergency)	–	–	G.	–	–	Chlorination
North Andover	1898	Great Pond	7,947,322	7,164	P.	1,525	100	Chlorination
North Attleborough	1884	Dug Wells	10,004,150	10,202	P.	1,755	100	– – –
Northborough	1882	Cold Harbor Brook Reservoir	2,066,415	2,396	G.	–	–	Coagulation, Sedimentation, Slow Sand Filtration
Northbridge	–		8,630,121	10,577	–	–	–	– – –
Whitin Machine Works	1889	Tubular Wells	–	–	P.	687	6	– – –
		Springs	–	–	P.	–	–	– – –
		Cook Allen Reservoir	–	–	P.	–	–	– – –
North Brookfield	1893	Doane Pond	2,277,546	3,186	P.	590	2	– – –
		North Pond	–	–	P.	–	–	– – –
Northfield	–		1,897,091	1,950	–	–	–	– – –
Northfield Water Co.	1900	Minot Brook Reservoir	–	–	G.	113	81	– – –
Northfield Schools Inc.	1879	Reservoir on Louisiana Brook	–	–	P. & G.	–	–	Slow Sand Filtration, Chlorination
E. Northfield Water Co.		Northfield Schools Inc. Supply	–	–	–	–	–	– – –
North Reading	—		2,459,320	2,321	–	–	–	– – –
Norton	1912	Tubular Wells	2,198,550	2,925	P.	395	7	– – –
Norwell	—		2,041,255	1,666	–	–	–	– – –
Norwood	1885	Buckmaster Pond	24,377,540	15,574	P.	2,719	100	Aeration, Slow Sand Filtration
		Tubular Wells	–	–	P.	–	–	– – –
Oak Bluffs	–		4,657,912	1,657	–	–	–	– – –
Cottage City Water Co.	1890	Springs	–	–	P.	1,525	95	– – –

* All water pumped at Chestnut Hill and Spot Pond.

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935) Number	Services (1935) Per Cent Metered	Treatment
Oakham	—		$443,496	441	–	–	–	– – –
Orange	1873	Coolidge Brook Reservoir	4,982,555	5,383	P.	–	–	– – –
		Crystal Spring	–	–	P.	–	–	– – –
Orleans	—		3,779,334	1,425	–	–	–	– – –
Otis	—		576,922	415	–	–	–	– – –
Oxford	–		2,899,431	4,249	–	–	–	– – –
Oxford Water Co.	1906	Tubular Wells	–	–	P.	707	81	– – –
Palmer	–		8,102,706	9,437	–	–	–	– – –
Palmer Fire District No. 1	1920	Graves Brook Reservoir	–	–	G.	644	59	Chlorination
		Tubular Wells (Emergency)	–	–	P.	–	–	– – –
Bondsville Water Co. (Bondsville)	1908	Tubular Wells	–	–	P.	284	7	– – –
Three Rivers (Cheney)	—	Spring and Tubular Wells	–	–	P. & G.	–	–	– – –
Three Rivers — Palmer Mills	—	Spring and Tubular Well	–	–	P. & G.	–	–	– – –
Thorndike Village (Holden)	1919	Hamilton Reservoir	–	–	G.	106	5	– – –
Thorndike Village (Kelly)	—	Spring	–	–	G.	16	0	– – –
Paxton	1934	Spring Basin	950,749	731	P.	–	–	– – –
PEABODY	1799	Spring Pond	23,639,100	22,082	P.	4,450	88	Chlorination
		Suntaug Lake	–	–	P.	–	–	Chlorination
		Tapley Brook Reservoir	–	–	P.	–	–	Chlorination
		Ipswich River (Emergency)	–	–	P.	–	–	Chlorination
		Cedar Pond (Emergency)	–	–	P.	–	–	Chlorination
Pelham	—		693,189	504	–	–	–	– – –
Pembroke	1913	Brockton Water Supply	2,586,880	1,621	–	159	94	– – –
Pepperell	1909	Tubular Wells	2,862,160	3,004	P.	685	88	– – –
Peru	—		291,180	151	–	–	–	– – –
Petersham	—		1,491,094	718	–	–	–	– – –
Phillipston	—		366,165	423	–	–	–	– – –
PITTSFIELD	1855	Ashley Reservoir	60,597,215	47,516	G.	8,911	7	Chlorination
		Ashley Lake	–	–	G.	–	–	Chlorination
		Sackett Reservoir	–	–	G.	–	–	Chlorination
		Hathaway Reservoir	–	–	G.	–	–	Chlorination
		Mill Brook Reservoir	–	–	G.	–	–	Chlorination
		Farnham Reservoir	–	–	G.	–	–	Chlorination
		Onota Lake (Emergency)	–	–	P.	–	–	Chlorination
Junction Water Co. (Noble) No. Adams Junction	1890	Reservoir on Brattle Brook	–	–	G.	–	–	– – –
Plainfield	—		333,567	332	–	–	–	– – –
Plainville	1909	North Attleborough Water Supply	1,525,301	1,606	–	–	–	– – –
Plymouth	1855	Little South Pond	22,420,150	13,183	P.	3,204	74	– – –
		Great South Pond	–	–	P.	–	–	– – –
		Boot Pond	–	–	P.	–	–	– – –
		Lout Pond	–	–	P.	–	–	– – –
Plympton	—		702,799	558	–	–	–	– – –
Prescott	—		26,825	18	–	–	–	– – –
Princeton	—		1,213,548	707	–	–	–	– – –

Provincetown	1893	Tubular Wells	4,050,003	4,071	P.	1,008	–	– – –
QUINCY	1884	Metropolitan Water Supply	124,543,900	76,909	–	17,038	100	– – –
Randolph	1888	Great Pond	5,993,200	7,580	P.	–	–	Coagulation, Sedimentation, Rapid Sand Filtration, Chlorination
Raynham	——		1,786,546	2,208	–	–	–	– – –
Reading	1891	Tubular Wells	16,588,560	10,703	P.	2,629	100	Iron Removal — Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration
Rehoboth	——		2,390,511	2,777	–	–	–	– – –
REVERE	1884	Metropolitan Water Supply	40,985,750	35,319	–	6,409	100	– – –
Richmond	——		710,118	628	–	–	–	– – –
Rochester	——		1,123,552	1,229	–	–	–	– – –
Rockland	1887	See Abington	8,162,967	7,890	P.	–	–	– – –
Rockport	1895	Cape Pond	5,613,030	3,634	P.	1,000	4	Chlorination
		Tubular Wells	–	–	P.	–	–	– – –
Rowe	——		672,426	277	–	–	–	– – –
Rowley	——		1,363,671	1,495	–	–	–	– – –
Royalston	——		814,771	841	–	–	–	– – –
Russell	1911	Black Brook Reservoir	3,956,958	1,283	G.	97	0	Chlorination
		Gravel Packed Well	–	–	P.	–	–	– – –
Rutland	1896	Muschopauge Pond	1,310,788	2,406	P.	189	99	Chlorination
SALEM	1868	See Beverly	57,946,090	43,472	P.	7,194	83	– – –
Salisbury	–		2,955,004	2,245	–	–	–	– – –
Salisbury Water Supply Co.	1915	Dug Wells	–	–	P.	845	0	– – –
Sandisfield	——		686,131	471	–	–	–	– – –
Sandwich	——		2,602,950	1,516	–	–	–	– – –
Saugus	1878	Lynn Water Supply	15,894,677	15,076	–	3,636	98	– – –
Savoy	——		171,370	299	–	–	–	– – –
Scituate	1901	Tubular Wells	12,766,073	3,846	P.	2,465	7	Chlorination, Coagulation, Sedimentation, Rapid Sand Filtration
		Old Oaken Bucket Pond	–	–	P.	–	–	Chlorination, Coagulation, Sedimentation, Rapid Sand Filtration
		Beaver Dam Spring	–	–	P.	–	–	– – –
		Gravel Packed (Bound Brook)	–	–	P.	–	–	Corrosive Correction
Seekonk	——		5,071,045	5,011	–	–	–	– – –
Sharon	1885	Tubular Wells	6,024,850	3,683	P.	844	2	– – –
		Dug Well (Emergency)	–	–	P.	–	–	– – –
Sheffield	–		1,463,495	1,810	–	–	–	– – –
Sheffield Water Co.	1897	Smith, Farmhouse, and Red Rock Springs	–	–	G.	136	5	– – –
Shelburne	–		2,669,820	1,606	–	–	–	– – –
Shelburne Falls Fire District	1912	Reservoirs on Fox Brook	–	–	G.	490	100	– – –
Sherborn	——		1,940,725	994	–	–	–	– – –
Shirley	–		2,015,484	2,548	–	–	–	– – –
Shirley Village Water District	1903	Dug Wells	–	–	P.	304	100	– – –
Shrewsbury	1915	Tubular and Gravel Packed Wells	8,338,137	7,144	P.	1,242	95	– – –
Shutesbury	——		400,745	239	–	–	–	– – –
Somerset	1927	Tubular Wells	12,898,600	5,656	P.	904	99	Corrosive Correction
SOMERVILLE	1867	Metropolitan Water Supply	117,182,500	100,773	–	13,962	99	– – –
Southampton	1900	Holyoke Water Supply	914,062	954	G.	–	–	– – –
Southborough	1930	Sudbury Reservoir	3,035,062	2,109	P.	271	99	Chlorination

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Census	Pumping or Gravity	Services (1935)		Treatment
						Number	Per Cent Metered	
Southbridge	–		$12,317,810	15,786	–	–	–	– – –
Southbridge Water Supply Co.	1880	2 Reservoirs on Hatchet Brook	–	–	G.	1,912	96	Aeration, Slow Sand Filtration
South Hadley	–		9,004,695	6,838	–	–	–	– – –
South Hadley Fire District No. 1	1872	Buttery Brook Reservoir	–	–	P.	–	–	Chlorination
		Leaping Well Reservoir	–	–	P.	–	–	– – –
South Hadley Fire District No. 2	1911	Dug Wells and Filter Gallery	–	–	P.	378	100	– – –
		Elmer Brook (North Branch)	–	–	P.	–	–	Slow Sand Filtration
Southwick	1930	Springfield Water Supply	1,934,137	1,540	–	117	96	– – –
Spencer	1883	Shaw Pond	4,508,584	6,487	G.	960	91	– – –
SPRINGFIELD	1874	Borden Brook Reservoir	281,852,280	149,642	G.	–	–	Sedimentation, Coagulation, Aeration, Slow Sand Filtration, Chlorination (Emergency only)
		Cobble Mountain Reservoir	–	–	G.	–	–	Sedimentation, Coagulation, Aeration, Slow Sand Filtration, Chlorination (Emergency only)
		Intake Reservoir Little River	–	–	G.	–	–	Sedimentation, Coagulation, Aeration, Slow Sand Filtration, Chlorination (Emergency only)
		Ludlow Reservoir	–	–	G.	–	–	Slow Sand Filtration (Seasonal)
Sterling	1935	Tubular Wells	1,926,725	1,556	P.	48	100	– – –
Stockbridge	–		4,634,921	1,921	–	–	–	– – –
Stockbridge Water Co.	1862	Lake Averic	–	–	P.	481	29	Chlorination
		Reservoir on Bear Mountain	–	–	G.	–	–	– – –
Hill Water Co.	1885	Springs	–	–	G.	15	0	– – –
Stoneham	1883	Metropolitan Water Supply	14,424,075	10,841	–	2,425	100	– – –
Stoughton	1886	Muddy Pond	8,541,528	8,478	P.	2,056	94	– – –
Stow	—		1,410,877	1,190	–	–	–	– – –
Sturbridge	1906	Tubular Wells	1,314,200	1,918	P.	113	98	– – –
Sudbury	—		2,399,505	1,638	–	–	–	– – –
Sunderland	–		1,035,310	1,182	–	–	–	– – –
Sunderland Water Co.	1883	Saw Mill Brook Reservoir	–	–	G.	124	0	– – –
Sutton	–		1,718,492	2,408	–	–	–	– – –
Sutton Water Co.	1915	Dug and Tubular Wells	–	–	P. & G.	84	79	– – –
Swampscott	1885	Metropolitan Water Supply	23,376,299	10,480	–	2,751	100	– – –
Swansea	—		4,507,330	4,327	–	–	–	– – –
TAUNTON	1876	Assawompsett Pond	35,111,880	37,431	P.	7,122	94	– – –
		Elder's Pond	–	–	P.	–	–	– – –
Templeton	—		2,867,728	4,302	–	–	–	– – –
Tewksbury	—		4,507,045	6,563	–	–	–	– – –
Tisbury	1887	Spring	5,277,420	1,822	P.	702	2	– – –
Tolland	—		379,008	141	–	–	–	– – –
Topsfield	–		3,025,930	1,113	–	–	–	– – –
L. P. Balentine	1912	Tubular and Dug Wells	–	–	P.	20	5	– – –
Townsend	1934	Tubular Wells	2,229,131	1,942	P.	–	–	– – –
Truro	—		1,551,098	541	–	–	–	– – –

Tyngsborough	—		1,210,350	1,331	—	—	—	— — —
Tyringham	—		411,036	243	—	—	—	— — —
Upton	—		1,351,815	2,163	—	—	—	— — —
Uxbridge	1879	Tubular Wells	7,203,514	6,397	P.	878	100	— — —
		Springs	—	—	G.	—	—	— — —
Wakefield	1883	Crystal Lake	21,418,205	16,494	P.	3,620	100	Chlorination, Aeration, Slow Sand Filtration
		Tubular Wells	—	—	P.	—	—	— — —
Wales	—		346,739	382	—	—	—	— — —
Walpole	1896	Tubular Wells	14,326,582	7,449	P.	1,568	96	— — —
WALTHAM	1873	Dug Wells	55,743,450	40,557	P.	6,350	100	— — —
Ware	1886	Dug and Tubular Wells	6,561,086	7,727	P.	1,037	100	Corrosive Correction
Wareham	—		12,792,455	6,047	—	—	—	— — —
Wareham Fire District	1908	Tubular Wells	—	—	P.	1,069	28	— — —
Onset Fire District	1894	Jonathan Pond	—	—	P.	1,530	0	— — —
Warren	—		2,119,591	3,662	—	—	—	— — —
Warren Water District	1923	Tubular Wells	—	—	P.	375	2	— — —
West Warren Water Co.	1912	Dug Wells	—	—	P.	—	—	— — —
Warwick	—		375,587	565	—	—	—	— — —
Washington	—		204,408	252	—	—	—	— — —
Watertown	1885	Metropolitan Water Supply	53,046,330	35,827	—	6,142	100	— — —
Wayland	1878	Tubular Wells	5,565,874	3,346	P.	918	2	— — —
Webster	1881	Dug and Tubular Wells	10,639,614	13,837	P.	1,693	95	— — —
		Filter Gallery (Emergency)	—	—	P.	—	—	— — —
Wellesley	1884	Tubular and Dug Wells	38,944,860	13,376	P.	3,365	100	Corrosive Correction
		Filter Gallery	—	—	P.	—	—	— — —
Wellfleet	—		2,012,000	948	—	—	—	— — —
Wendell	—		949,752	397	—	—	—	— — —
Wenham	—		3,813,765	1,196	—	—	—	— — —
Westborough	1879	Filter Basin below Westborough Reservoir	4,769,078	6,073	—	—	—	— — —
			—	—	G.	883	89	— — —
West Boylston	—		2,213,488	2,158	—	—	—	— — —
Pinecroft Water District	1933	Worcester Water Supply	—	—	—	—	—	— — —
West Bridgewater	1911	Brockton Water Supply	3,084,907	3,356	—	—	—	— — —
West Brookfield	1913	Tubular Wells	1,367,061	1,258	P.	235	100	— — —
WESTFIELD	1874	Montgomery Reservoir	19,734,465	18,788	G.	3,184	7	— — —
		Tekoa Reservoir	—	—	G.	—	—	— — —
		Winchell Reservoir	—	—	G.	—	—	Chlorination
		Japhet Brook Reservoir	—	—	G.	—	—	Chlorination
		Granville Reservoir	—	—	G.	—	—	Chlorination
Westford	—		3,947,935	3,789	—	—	—	— — —
Westford Water Co.	1908	Tubular Wells	—	—	P.	459	0	— — —
Westhampton	—		369,705	405	—	—	—	— — —
Westhampton Water Co.	1894	Reservoir	—	—	G.	25	0	— — —
Westminster	—		1,561,429	1,965	—	—	—	— — —
Westminster Aqueduct Co.	1890	Springs	—	—	G.	50	0	— — —
West Newbury	—		1,204,435	1,475	—	—	—	— — —
Weston (Town Supply)	1896	Dug and Tubular Wells	10,056,227	3,848	P.	640	98	— — —
Glen Farms Water Co.	1919	Dug Wells	—	—	P.	25	100	— — —
Westport	—		5,769,625	4,355	—	—	—	— — —
West Springfield	1875	Reservoirs on Bear Hole Brook	24,974,510	17,118	P.	—	—	Aeration, Slow Sand Filtration, Chlorination

City or Town	Date of Introduction	Source of Supply	Total Valuation of Assessed Estate January 1, 1935	Population 1935 Cenus	Pumping or Gravity	Services (1935)		Treatment
						Number	Per Cent Metered	
West Stockbridge	–		$1,186,685	1,138	–	–	–	– – –
East Mountain Water Co.	1873	East Mountain Spring Reservoir and Springs	–	–	G.	76	51	– – –
West Tisbury	——		779,475	282	–	–	–	– – –
Westwood	1930	Dedham Water Company	5,048,474	2,537	–	–	–	– – –
Westwood Water Co.	1901	Tubular Wells	–	–	P.	163	4	– – –
Weymouth	1885	Great Pond	46,809,207	21,748	P.	6,960	74	Coagulation, Sedimentation, Rapid Sand Filtration
Whately	–		1,087,968	1,133	–	–	–	– – –
Homer L. Crafts Supply	——	Springs	–	–	P. & G.	–	–	– – –
Allis Estate Water Supply	1898	Springs	–	–	G.	–	–	– – –
Whitman	1883	Brockton Water Supply	7,912,845	7,591	–	1,848	100	– – –
Wilbraham	1929	Springfield Water Supply	3,070,986	2,969	–	259	100	– – –
Williamsburg	1903	2 Reservoirs on Unquomonk Brook	1,275,990	1,859	G.	372	1	– – –
Williamstown	–		6,895,265	4,272	–	–	–	– – –
Williamstown Water Co.	1859	Rattlesnake Brook Reservoir	–	–	G.	652	100	Chlorination (Seasonal)
		Cold Spring	–	–	G.	–	–	– – –
		Sherman Spring	–	–	G.	–	–	– – –
		Paul Brook	–	–	G.	–	–	Chlorination (Seasonal)
Wilmington	1928	Tubular Wells	4,360,403	4,493	P.	634	8	– – –
Winchendon	1896	Dug Wells	5,347,730	6,603	P.	1,236	97	– – –
Winchester	1873	North Reservoir	31,669,700	13,371	G.	3,158	100	Chlorination
		Middle Reservoir	–	–	G.	–	–	Chlorination
		South Reservoir	–	–	G.	–	–	Chlorination
Windsor	——		432,000	412	–	–	–	– – –
Winthrop	1884	Metropolitan Water Supply	24,506,550	17,001	–	3,860	100	– – –
WOBURN	1873	Horn Pond (Emergency)	21,148,940	19,695	P.	3,980	98	Chlorination
		Gravel Packed Wells	–	–	P.	–	–	– – –
WORCESTER	1845	Kettle Brook Reservoir No. 1	292,929,400	190,471	G.	30,094	94	– – –
		Kettle Brook Reservoir No. 2	–	–	G.	–	–	– – –
		Kettle Brook Reservoir No. 3	–	–	G.	–	–	– – –
		Kettle Brook Reservation No. 4	–	–	G.	–	–	– – –
		Lynde Brook Reservoir	–	–	G.	–	–	– – –
		Quinapoxet Pond	–	–	G.	–	–	– – –
		Upper Holden Reservoir	–	–	G.	–	–	– – –
		Lower Holden Reservoir	–	–	G.	–	–	– – –
		Kendall Reservoir	–	–	G.	–	–	– – –
		Pine Hill Reservoir	–	–	G.	–	–	– – –
Worthington	–		553,543	530	–	–	–	– – –
Worthington Fire District	1911	Springs	–	–	G.	36	0	– – –
Wrentham	1908	Tubular Wells	3,610,165	4,160	P.	552	99	– – –
Yarmouth	1931	Tubular Wells	4,872,700	2,095	P.	136	8	– – –

SUMMARY OF WATER TREATMENT

City or Town	Date of Installation	Present Rated Capacity of Plant (M.G.D.)	Average Output (M.G.D.)	Supply	Treatment	Laboratory Control
					Rapid Sand Filtration Plants	
*Athol	1887	–	.10	Surface	**Coagulation, Filtration (pressure filters)	None
Braintree	1934	2.50	1.22	Surface	Coagulation, Sedimentation, Filtration, Corrosive Correction, Chlorination	Chemical
Cambridge	1922	22.90	12.07	Surface	Coagulation, Sedimentation, Filtration, Aeration, Corrosive Correction, Chlorination	Chemical and Bacteriological
Chicopee	1931	5.00	3.55	Surface	Aeration, Coagulation, Sedimentation, Filtration, Corrosive Correction, Chlorination	Chemical and Bacteriological
*Leominster	Under Constr.	2.00	–	Surface	Coagulation, Sedimentation, Filtration, Corrosive Correction, Chlorination	Chemical
Randolph and Holbrook	Under Constr.	2.00	–	Surface	Coagulation, Sedimentation, Filtration, Corrosive Correction, Chlorination	– –
*Salem and Beverly	1935	9.60	5.97	Surface	Coagulation, Sedimentation, Filtration, Corrosive Correction, Ammoniation, Chlorination	Chemical and Bacteriological
*Scituate	1924	1.50	–	Surface	Chlorination, Coagulation, Sedimentation, Filtration	– –
Weymouth	1935	4.00	1.68	Surface	Coagulation, Sedimentation, Filtration, Corrosive Correction, Chlorination	Chemical
					Slow Sand Filtration Plants	
*Athol	1913	–	.52	Surface	Filtration	None
Greenfield	1935	2.00	1.38	Surface	**Coagulation, Sedimentation, Filtration, Chlorination	Chemical
Lawrence	1893	12.00	5.85	Surface	Filtration, Chlorination	None
Milford and Hopedale Milford Water Co.	1896	–	.81	Ground and Surface	Filtration, Corrosive Correction, Chlorination	Chemical and Bacteriological
Newburyport	–	2.00	1.31	Ground and Surface	Filtration	None
*Northfield Northfield Schools, Inc.	1915	.14	–	Ground and Surface	Filtration	None
Northborough	Under Constr.	.33	–	Surface	Coagulation, Sedimentation, Filtration, Corrosive Correction	– –
*Norwood	1913	1.20	.57	Surface	Aeration, Filtration	None
Southbridge (Water Supply Co.)	1908	1.20	1.01	Surface	Aeration, Filtration	None
*South Hadley South Hadley F. D. No. 2	1931	.21	–	Surface	Filtration	None
Springfield West Parish Filters	1909	30.00	14.83	Surface	Aeration, **Coagulation, **Sedimentation, Filtration	Chemical and Bacteriological
Ludlow Filters	1906	3.20	2.21	Surface	Filtration	Chemical and Bacteriological
Wakefield	1928	2.00	.74	Surface	Chlorination, Aeration, Filtration	None
West Springfield	1907	2.00	1.28	Surface	Aeration, Filtration, Chlorination	None

*Certain of the sources only. **Seasonal Coagulation.

City or Town	Date of Installation	Present Rated Capacity of Plant (M.G.D.)	Average Output (M.G.D.)	Supply	Treatment	Laboratory Control
					Iron Removal Plants	
Amesbury	1927	1.50	.64	Ground	Chlorination, Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration	None
Billerica	1932	–	.31	Ground	Aeration, Sedimentation, Chlorination	None
Brookline	1918	9.60	4.79	Ground	Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration	None
*Cohasset	1913	1.00	–	Ground and Surface	Aeration with Coke, Coagulation, Sedimentation, Corrosive Correction, Rapid Sand Filtration	Chemical and Bacteriological
Georgetown	1935	.14	.02	Ground	Aeration, Coke Filtration (Future development includes Slow Sand Filtration)	None
Lowell	1916	10.00	5.53	Ground	Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration	Chemical
Marblehead	1909	2.00	.78	Ground	Aeration, Sedimentation, Slow Sand Filtration	Chemical
Middleborough	1913	–	.30	Ground	Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration	Chemical
Reading	Under Constr.	1.5	–	Ground	Aeration, Coke Filtration, Sedimentation, Slow Sand Filtration	– –

*Certain of the sources only.

SUMMARY OF WATER TREATMENT
(Continued)

Chlorination

City or Town	Date of Installation
Abington and Rockland**	1927
Adams	1928
Amesbury	1935
Amherst	1928
Andover	1932
Ashburnham	1933
Billerica	1934
Braintree	1926
*Brookfield (Emergency only)	1930
Cambridge	1923
Canton	1931
Chicopee	1926
Clinton	1935
*Cohasset	1932
*Colrain	
Griswoldville Mfg. Co.	1934
Danvers and Middleton	1934
Deerfield	
South Deerfield W. S. Dist. (Seasonal)	1934
Dracut	1934
Egremont	
South Egremont Water Co. (Seasonal)	1934
Fall River	1932
Framingham	1919
*Franklin (Emergency only)	1935
Gardner	1934
Gloucester	1935
Greenfield	1920
Haverhill	1933
*Hingham	1934
Holliston	1922
Ipswich	1933
Lawrence	1918
Lee	
Berkshire Water Co.	1929
*Lenox	
Lenox Water Co. (Seasonal)	1933
Leominster	1933
Lowell (Seasonal)	1933
Lynn	1935
Marlborough	1928
Maynard	1934
Medway	1931
Methuen	1932
Metropolitan District**	1930
Milford and Hopedale	
Milford Water Co.	1931
Needham	1931
Newton	1933
*North Adams	1933
*Northampton (Emergency Supply only)	1932
North Andover	1920
Northborough	1934
*Northfield	
Northfield Schools, Inc.	1933
Palmer	
Palmer Fire Dist. No. 1	1933
Peabody	1925
Pittsfield	1934
Randolph and Holbrook**	1934
Rockport	1924
*Russell	1934
Rutland	1931
Salem and Beverly**	1935
*Scituate	1931
Southborough	1930
South Hadley	
South Hadley Fire Dist. No. 1	1927
*Springfield (Emergency only)	1928
Stockbridge	
Stockbridge Water Co.	1923
Wakefield	1918
*Westfield	1927
West Springfield	1927
*Williamstown (Seasonal)	1932
Winchester	1935
*Woburn (Emergency Supply only)	1923

*Certain of the sources only.
**Ammoniation in conjunction with chlorination.

Corrosive Correction
(Natural Waters)

City or Town	Date of Installation	Supply
Canton	1935	Ground
Falmouth	1932	Surface
*Hingham	1934	Surface
Needham	1935	Ground
Newton	1931	Ground
*Scituate	1933	Ground
Somerset	1933	Ground
Ware	1935	Ground
Wellesley	1935	Ground

*Certain of the sources only.

Samples of water have been collected regularly from the various sources throughout the State for chemical analysis and microscopical examination, and a large number of samples have been collected for routine bacterial examinations. This work was greatly assisted by an assignment in the year 1934 of an assistant engineer to the office of the District Health Officer in Springfield.

The following tables show the average results of chemical analyses of samples of water collected from the various sources of public water supply during the year 1935:

Analyses of the Water of Public Water Supplies

Averages of Chemical Analyses of Surface-Water Sources for the Year 1935

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorides	Hardness
					Albuminoid			
				Free	Total	Suspended		
Metropolitan Water District	Wachusett Reservoir, upper end	24	38	.016	.099	–	2.6	13
	Wachusett Reservoir, lower end	10	37	.012	.091	–	2.6	13
	Sudbury Reservoir	12	39	.017	.116	–	3.0	16
	Framingham Reservoir No. 3	13	41	.008	.102	–	3.3	17
	Ware River at Coldbrook intake	52	453	.014	.150	–	1.9	11
	Hopkinton Reservoir	53	42	.014	.137	–	2.9	11
	Ashland Reservoir	54	46	.013	.136	–	4.2	14
	Framingham Reservoir No. 2	61	64	.023	.170	–	7.7	18
	Lake Cochituate	21	77	.242	.134	–	8.1	29
	Chestnut Hill Reservoir	12	45	.142	.095	–	4.1	16
	Weston Reservoir	14	39	.007	.076	–	2.8	15
	Spot Pond	8	40	.007	.108	–	3.8	16
	Tap in State House	9	43	.027	.095	–	4.0	17
	Tap in Revere	7	41	.002	.084	–	3.8	17
	Tap in Quincy	10	42	.006	.051	–	3.9	17
Abington	Big Sandy Pond	6	38	.052	.108	–	8.7	8
Acushnet (Fire and Water District)	New Bedford Water Supply							
Adams (Fire District)	Bassett Brook	0	33	.010	.056	–	1.2	21
Agawam	Springfield Water Supply							
Amherst (Water Co.)	Atkins Pond	9	31	.046	.243	–	1.4	7
	Amethyst Brook-intake Reservoir	41	42	.005	.093	–	1.8	10
Andover	Haggett's Pond	12	50	.028	.133	–	5.0	19
Arlington	Metropolitan Water Supply							
Ashburnham	Upper Naukeag Lake	4	37	.001	.029	–	1.5	7
Ashfield (Water Co.)	Highland Spring Reservoir	19	54	.002	.071	–	1.3	13
Athol	Buckman Brook Reservoir (Newton Reservoir)	18	30	.001	.093	–	1.4	8
	Thousand Acre Meadow Brook	138	55	.022	.220	–	1.6	11
	Inlet, Summer Street filters	16	31	.002	.104	–	1.5	9
	Outlet, Summer Street filters	9	31	.005	.039	–	1.8	8
	Phillipston Reservoir	53	39	.013	.205	–	2.7	12
	Outlet of Mechanical Filter	50	45	.018	.197	–	3.0	13
Barre	Reservoir	10	34	.008	.076	–	1.6	31
Belmont	Metropolitan Water Supply							
Beverly	Joint supply with Salem							
Blandford (Fire District)	Freeland Brook	6	43	.000	.014	–	1.9	15
Boston	Metropolitan Water Supply							
Braintree	Raw Water	29	60	.039	.138	–	7.7	18
	Final filter effluent	2	70	.050	.076	–	7.7	19
Brockton	Silver Lake	5	37	.004	.088	–	6.6	8
Brookfield	Cooley Hill Reservoir	10	30	.024	.180	–	1.6	9
Cambridge	Fresh Pond	6	88	.044	.122	–	7.5	39
	Filter effluent	2	92	.028	.051	–	6.7	41
	Stony Brook Reservoir	32	69	.032	.162	–	6.1	26
	Upper Hobbs Brook Reservoir	47	61	.045	.203	–	5.2	23
	Lower Hobbs Brook Reservoir	30	62	.040	.201	–	5.2	25
Chelsea	Metropolitan Water Supply							
Cheshire (Water Co.)	Kitchen Brook Reservoir	4	52	.005	.037	–	1.2	34
Chester	Austin Brook Reservoir	5	40	.007	.095	–	1.3	17
	Horn Pond	8	39	.007	.127	–	1.3	17
Chicopee	Cooley Brook Reservoir, filtered	0	56	.024	.014	–	2.6	25
	Morton Brook	2	64	.009	.022	–	3.6	22
Clinton	Lower Lynde's Reservoir	21	38	.040	.157	–	1.9	17
	Heywood Pond	15	31	.014	.131	–	1.8	13
	Spring Basin	7	52	.015	.064	–	2.7	20
Colrain (Griswoldville)	McClellan Brook Reservoir	0	74	.001	.030	–	1.4	49
Colrain (Fire District No. 1)	Mountain Brook Reservoir	0	77	.001	.015	–	1.0	61
Concord	Nagog Pond	5	44	.014	.144	–	4.4	9
Dalton (Fire District)	Egypt Brook Reservoir	24	36	.009	.089	–	1.3	11
	Cady Brook	24	59	.023	.133	–	1.3	28
	Tap in town	18	45	.004	.073	–	1.3	18
	Windsor Reservoir	35	54	.040	.194	–	1.1	26
Danvers	Middleton Pond	45	46	.023	.153	–	4.1	16
	Swan Pond	24	40	.024	.154	–	3.6	17
Dartmouth	New Bedford Water Supply							
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	6	64	.001	.030	–	1.5	40
East Bridgewater	Brockton Water Supply							
East Longmeadow	Springfield Water Supply							

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

(Parts per Million)

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorides	Hardness
				Free	ALBUMINOID			
					Total	Sus-pended		
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	0	39	.000	.009	–	1.2	17
Erving (Millers Falls Fire and Water District)	Montague (Turners Falls Fire District) Water Supply							
EVERETT	Metropolitan Water Supply							
FALL RIVER	North Watuppa Lake	5	38	.011	.112	–	5.7	11
Falmouth	Long Pond	0	38	.007	.076	–	10.5	6
FITCHBURG	Ashby Reservoir	18	26	.050	.118	–	2.2	8
	Scott Reservoir	6	32	.051	.127	–	1.9	6
	Meetinghouse Pond	7	29	.035	.119	–	2.0	8
	Wachusett Lake	6	37	.025	.080	–	1.8	5
	Falulah Brook	19	29	.030	.115	–	2.0	7
	Lovell Reservoir	14	27	025	.092	–	1.6	5
GARDNER	Crystal Lake	9	51	.026	.148	–	3.9	23
GLOUCESTER	Haskell Reservoir	7	42	.014	.053	–	8.2	6
	Dike's Reservoir	36	48	.039	.114	–	8.6	8
	Wallace Reservoir	15	42	.032	.107	–	9.5	9
	Babson Reservoir	44	–	.089	.137	–	10.5	8
Great Barrington (Housatonic Water Works Co.)	Long Pond	4	88	.018	.142	–	1.3	72
Great Barrington (Fire District)	East Mountain Reservoir	3	61	.000	.048	–	1.4	61
Greenfield	Glen Brook Upper Reservoir	5	61	.010	.039	–	1.5	35
	Glen Brook Lower Reservoir	2	61	.008	.050	–	1.6	37
Groveland	Haverhill Water Supply							
Hadley (Water Supply District)	Hart's Brook Reservoir	10	42	.001	.075	–	1.6	21
Hanson	Brockton Water Supply							
Hatfield	Running Gutter Brook Reservoir	9	77	.000	.017	–	1.8	31
HAVERHILL	Millvale Reservoir	73	61	.065	.159	–	4.4	24
	Johnson's Pond	27	54	.023	.124	–	5.5	26
	Crystal Lake	13	38	.011	.125	–	4.2	16
	Pentucket Lake	4	45	.010	.133	–	4.1	22
	Kenoza Lake	15	50	.008	.115	–	5.2	26
Hingham (Water Co.)	Accord Pond	14	41	.009	.135	–	6.7	11
Hinsdale (Fire District)	Reservoir	3	24	.001	.032	–	1.2	6
Holbrook	Joint Supply with Randolph							
Holden	Rutland Water Supply							
HOLYOKE	Hugh McLean Reservoir	7	37	.010	.094	–	1.4	19
	Carmody Reservoir	21	34	.032	.131	–	1.5	14
	Wright and Ashley ponds	7	49	.016	.092	–	1.5	24
	White Reservoir	11	33	.021	.123	–	1.3	14
	Whiting Street Reservoir	6	59	.016	.124	–	1.5	34
Hopedale	Milford Water Supply							
Hudson	Gates Pond	10	35	.017	.113	–	2.6	11
Hull	Hingham Water Supply							
Huntington (Fire District)	Cold Brook Reservoir	11	38	.002	.035	–	1.5	15
Ipswich	Dow's Brook Reservoir	20	53	.023	.149	–	6.3	16
	Bull Brook Reservoir	92	71	.023	.182	–	6.3	25
Lancaster	Clinton Water Supply							
LAWRENCE	Merrimack River, filtered	36	57	.050	.101	–	5.4	13
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	5	39	.000	.028	–	1.0	19
	Codding Brook Lower Reservoir	3	40	.001	.034	–	1.0	20
	Basin Pond Brook	26	42	.005	.083	–	1.1	18
Lenox (Water Co.)	Lower Root Reservoir	5	72	.009	.068	–	1.0	67
	Woolsey Reservoir	4	70	.009	.042	–	1.2	57
LEOMINSTER	Fall Brook Reservoir	10	28	.020	.076	–	1.9	5
	Haynes Reservoir	7	23	.020	.103	–	1.6	5
	Morse Reservoir	12	25	.014	.108	–	1.7	5
	No-Town Reservoir	18	26	.014	.109	–	1.5	5
Lexington	Metropolitan Water Supply							
Lincoln	Sandy Pond	5	32	.007	.080	–	3.5	9
Longmeadow	Springfield Water Supply							
Ludlow	Springfield Water Supply							
LYNN	Breeds Pond	24	59	.038	.167	–	6.8	25
	Birch Pond	6	52	.029	.125	–	7.0	19
	Hawkes Pond	56	73	.094	.232	–	7.5	30
	Walden Pond	37	68	.077	.194	–	7.1	29
Lynnfield (Water District)	Lynn Water Supply							
MALDEN	Metropolitan Water Supply							
Manchester	Gravel Pond	15	44	.007	.091	–	8.4	13

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorides	Hardness
				Free	Albuminoid			
					Total	Sus-pended		
Marlborough	Lake Williams	5	47	.016	.150	–	5.6	19
	Millham Brook Reservoir	39	53	.047	.139	–	4.2	15
Maynard	White Pond	4	31	.011	.109	–	3.1	11
Medford	Metropolitan Water Supply							
Melrose	Metropolitan Water Supply							
Middleton	Joint supply with Danvers							
Milford (Water Co.)	Dug wells and Charles River, filtered	8	57	.007	.023	–	3.6	30
Milton	Metropolitan Water Supply							
Montague (Turners Falls Fire District)	Lake Pleasant	7	34	.008	.053	–	1.7	8
Monterey (Water Co.)	Reservoir	5	86	.001	.011	–	1.5	77
Nahant	Metropolitan Water Supply							
New Bedford	Great Quittacas Pond	28	41	.012	.136	–	5.5	9
	Little Quittacas Pond	17	41	.015	.135	–	5.3	10
Newburyport	Dug wells and Artichoke River, filtered	8	64	.004	.105	–	6.6	27
North Adams	Broad Brook	8	35	.004	.050	–	1.1	17
	Notch Brook Reservoir	5	71	.009	.032	–	1.1	55
	Mount Williams Reservoir	4	71	.002	.044	–	1.0	55
Northampton	Middle Reservoir (Roberts Meadow Brook)	9	47	.010	.083	–	1.7	22
	Mountain Street Reservoir	8	45	.004	.052	–	1.4	22
North Andover	Great Pond	8	46	.015	.143	–	4.8	21
Northborough	Lower Reservoir (Cold Harbor Brook)	74	45	.023	.178	–	3.0	11
North Brookfield	Doane Pond	25	35	.041	.185	–	2.1	11
	North Pond	26	35	.049	.223	–	2.1	9
Northfield (Water Co.)	Minot Brook Reservoir	10	37	.000	.017	–	1.3	13
Northfield (Northfield Schools, Inc.)	Reservoir—East Northfield	14	47	.007	.095	–	1.3	20
Norwood	Buckmaster Pond, filtered	6	56	.021	.077	–	5.6	21
Orange	Coolidge Brook Reservoir	14	35	.020	.063	–	1.6	9
Palmer (Fire District No. 1)	Lower Reservoir (Graves Brook)	10	47	.019	.043	–	2.0	17
Peabody	Spring Pond	11	60	.028	.142	–	6.7	25
	Suntaug Lake	19	59	.043	.160	–	6.7	23
Pembroke	Brockton Water Supply							
Pittsfield	Sackett Reservoir	4	78	.011	.036	–	1.2	66
	Hathaway Reservoir	4	91	.018	.047	–	1.3	81
	Ashley Reservoir	7	46	.032	.099	–	1.2	31
	Ashley Lake	9	40	.008	.078	–	1.0	24
	Farnham Reservoir	22	42	.034	.099	–	1.1	18
	Mill Brook	23	47	.009	.112	–	1.0	18
Plainville	North Attleborough Water Supply							
Plymouth	Little South Pond	1	29	.007	.152	–	6.8	5
	Great South Pond	2	29	.006	.115	–	6.8	5
Quincy	Metropolitan Water Supply							
Randolph	Great Pond	32	58	.037	.152	–	8.1	19
Revere	Metropolitan Water Supply							
Rockland	Joint supply with Abington							
Rockport	Cape Pond	30	77	.020	.202	–	21.2	16
Russell	Black Brook Reservoir	26	36	.009	.088	–	1.3	14
Rutland	Muschopauge Lake	4	37	.080	.117	–	3.0	15
Salem	Wenham Lake	39	77	.060	.165	–	9.0	29
	Longham Reservoir	104	73	.089	.297	–	9.5	22
	Ipswich River at pumping station	40	121	.045	.142	–	8.7	51
Saugus	Lynn Water Supply							
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	2	61	.001	.022	–	1.1	37
Somerville	Metropolitan Water Supply							
Southborough	Sudbury Reservoir	13	39	.007	.077	–	3.5	15
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	14	28	.014	.071	–	2.1	7
	Hatchet Brook Reservoir No. 4	22	33	.030	.110	–	2.1	8
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	8	48	.017	.073	–	3.5	14
	Leaping Well Reservoir	4	38	.005	.117	–	2.2	12
Southwick	Springfield Water Supply							
Spencer	Shaw Pond	6	29	.005	.106	–	1.9	7
Springfield	Cobble Mountain Reservoir	18	33	.020	.107	–	1.5	13
	Westfield Little River, filtered	9	37	.002	.042	–	1.4	14
Stockbridge (Water Co.)	Lake Averic	5	69	.008	.114	–	1.6	50

Averages of Chemical Analyses of Surface-Water Sources, etc.—Concluded

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia			Chlorides	Hardness
				Free	Albuminoid			
					Total	Sus-pended		
Stoneham	Metropolitan Water Supply							
Stoughton	Muddy Pond	9	42	.012	.046	–	3.4	11
Sunderland (Water Co.)	Saw Mill Brook Reservoir	0	75	.000	.014	–	1.9	43
Swampscott	Metropolitan Water Supply							
TAUNTON	Assawompsett Pond	16	36	.029	.144	–	5.3	10
	Elder's Pond	6	35	.016	.121	–	5.2	9
Wakefield	Crystal Lake, filtered	6	71	.005	.091	–	8.5	31
Wareham (Onset Fire District)	Jonathan Pond	2	34	.011	.068	–	6.5	6
Watertown	Metropolitan Water Supply							
West Bridgewater	Brockton Water Supply							
WESTFIELD	Montgomery Reservoir	30	32	.004	.121	–	1.3	6
	Winchell Reservoir	8	32	.006	.048	–	1.5	7
	Granville Reservoir	10	31	.023	.059	–	1.5	8
Westhampton (Water Co.)	Reservoir	18	45	.003	.063	–	1.5	17
West Springfield	Bear Hole Brook Reservoir	6	69	.025	.065	–	1.5	38
	Bear Hole Brook Reservoir, filtered	2	69	.003	.029	–	1.5	38
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	6	54	.001	.019	–	1.4	29
Weymouth	Great Pond	29	45	.010	.113	–	5.9	7
Whitman	Brockton Water Supply							
Wilbraham	Springfield Water Supply							
Williamsburg	Reservoir	7	46	.004	.105	–	1.4	23
Williamstown (Water Co.)	Paul Brook	0	73	.001	.025	–	1.3	54
	Rattlesnake Brook Reservoir	3	86	.003	.022	–	1.0	70
Winchester	North Reservoir	5	42	.005	.097	–	4.2	21
	Middle Reservoir	6	35	.011	.157	–	3.9	18
	South Reservoir	4	39	.023	.084	–	4.0	18
Winthrop	Metropolitan Water Supply							
WORCESTER	Pine Hill Reservoir	10	37	.043	.130	–	2.7	14
	Upper Holden Reservoir	8	30	.004	.084	–	1.9	8
	Lower Holden Reservoir	7	31	.003	.071	–	1.9	9
	Leicester Reservoir (Lynde Reservoir)	11	38	.015	.105	–	2.4	12
	Bottomly Reservoir (Kettle Brook No. 4)	34	43	.012	.155	–	2.5	15
	Kent Reservoir (Kettle Brook No. 1)	17	41	.042	.146	–	2.8	15
	Mann Reservoir (Kettle Brook No. 2)	18	43	.014	.150	–	2.4	14
	Kendall Reservoir	7	36	.017	.105	–	2.4	13
	Quinapoxet Pond	22	36	.009	.109	–	2.0	12

Averages of Chemical Analyses of Ground-Water Sources for the Year 1935

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron
				Free	Albu-minoid		Nitrates	Nitrites		
Acton (West and South Water Supply District)	Tubular wells	0	101	.000	.008	6.1	1.60	.000	42	.05
Amesbury	Tubular wells	20	135	.085	.019	5.2	.055	.001	63	6.2
	Tubular wells, filtered	4	125	.000	.010	5.9	.062	.000	63	.10
Ashland	New tubular wells	3	57	.011	.023	4.0	.043	.000	26	.11
ATTLEBORO	Dug wells and filtered water, South Attleboro	1	47	.005	.022	4.6	.060	.000	25	.05
	Tubular wells, West Mansfield	5	49	.044	.027	4.1	.020	.004	20	1.75
Auburn (Water Co.)	Tubular wells	0	114	.001	.005	9.4	1.63	.000	55	.10
Avon	Dug and tubular wells	0	77	.000	.009	5.8	1.78	.000	26	.05
Ayer	Dug well	0	85	.001	.005	8.8	1.62	.000	36	.07
	Tubular wells	3	76	.005	.009	4.6	.123	.000	38	.55
Barnstable (Water Co)	Tubular wells (old supply)	0	45	.003	.005	11.7	.037	.000	8	.14
Bedford	Dug well	2	41	.000	.012	3.3	.030	.000	14	.09
	Tubular wells	2	47	.000	.008	3.3	.182	.000	16	.32
Belchertown (Water District)	Tubular wells	0	73	.013	.005	4.2	.600	.000	29	.09
Billerica	Gravel-packed wells — Tap in pumping station	18	84	.087	.063	8.7	.150	.000	29	.32
Bourne										
(Monument Beach)	Tubular wells	0	48	.001	.003	10.2	.433	.000	13	.06
(Pocasset Beach)	Tubular wells	0	68	.051	.007	19.6	.500	.001	15	.14
(Pocasset — North Shore)	Tubular wells	2	65	.001	.007	17.7	.240	.000	17	.12
(Sagamore — Ware Tenement Supply)	Tubular wells	0	50	.000	.004	8.4	.900	.000	9	.05
(Sagamore — Keith Block)	Tubular wells	0	50	.000	.003	10.7	.117	.000	8	.11
(Sagamore — Knowlton Property)	Tubular wells	3	42	.002	.004	8.8	.020	.000	11	.72
(Sagamore — Savery) Supply)	Tubular wells	2	54	.000	.003	10.7	.267	.000	14	.28
(Sagamore Beach)	Tubular wells	0	58	.003	.005	16.8	.300	.000	14	.06
(Sagamore Heights)	Tubular wells	0	52	.004	.006	13.3	.030	.001	14	.27
Bridgewater	Tubular wells	1	69	.001	.007	5.9	1.68	.000	20	.12
Brookline	Tubular wells and filter gallery, filtered	8	90	.002	.038	7.9	.250	.000	43	.11
Canton	Henry's Spring well	4	81	.002	.018	7.1	1.00	.000	29	.46
	Ward well	7	81	.006	.022	6.0	.675	.000	31	.34
	Springdale tubular wells	3	74	.014	.021	5.6	.575	.001	28	.14
Chatham (Water Co.)	Filter gallery near White Pond	5	48	.023	.033	17.3	.037	.000	11	.25
	Tubular wells	0	39	.000	.005	12.3	.037	.000	7	.08
Chelmsford (North Chelmsford Fire District)	Tubular wells	13	53	.131	.046	4.2	.492	.001	24	.28
Chelmsford (Water District)	Tubular wells	3	85	.004	.010	6.5	1.05	.005	33	.25
Cohasset (Water Co.)	Tubular wells, Elms Meadow	0	134	.002	.023	18.3	1.70	.000	53	.07
	Dug well, filtered	3	87	.043	.055	11.5	.046	.000	28	.13
Cummington	Springs, tap	0	45	.001	.004	2.5	1.15	.000	21	.09
Dedham (Water Co.)	Dug and tubular wells	5	99	.010	.035	9.5	1.05	.001	42	.13
Deerfield (Fire District)	Springs	0	48	.000	.008	1.9	.070	.000	25	.06
Douglas	Tubular wells	0	55	.000	.005	3.5	.732	.000	21	.15
Dover	Tubular wells	2	107	.028	.005	8.0	1.50	.007	47	.70
Dracut (Water Supply District)	Tubular wells, Dracut	4	131	.022	.042	9.1	1.70	.000	57	.12
	Tubular wells, Collinsville	9	59	.007	.057	3.0	.135	.000	24	.09
Dudley	Tubular wells	0	39	.001	.009	2.9	.173	.000	15	.13
Dunstable	Tubular wells	0	64	.000	.016	3.1	1.600	.000	25	.05
Duxbury (Fire and Water District)	Tubular wells	0	50	.000	.006	9.4	.077	.000	11	.05
East Brookfield	Dug wells	0	32	.001	.004	2.3	.030	.000	9	.05
Easthampton	Tubular wells	0	75	.000	.003	1.9	.333	.000	44	.08

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Easton (North Easton Village District) .	Dug well . .	8	49	.008	.021	5.0	.600	.000	22	.35
Easton (Unionville Fire and Water District)	North Easton Village District Water Supply									
Edgartown (Water Co.)	Dug and tubular wells . .	0	32	.002	.005	9.2	.023	.000	6	.05
Fairhaven (Water Co.)	Tubular wells near Nasketucket River . .	31	84	.004	.083	9.9	.353	.001	29	.12
	Tubular wells near Mattapoisett River . .	1	64	.000	.008	8.7	.662	.000	23	.10
Foxborough . .	Tubular wells .	0	55	.002	.008	4.6	.750	.000	24	.19
Framingham . .	Tap in pumping station . .	10	64	.084	.075	8.0	.050	–	28	.12
Franklin . . .	Tubular wells .	2	52	.005	.006	4.5	.110	.000	21	.19
Georgetown . .	Tubular wells (raw water) .	1	66	.001	.008	4.1	.052	.000	24	1.39
	Tubular wells (filtered water — clear water basin)	2	60	.002	.007	3.9	.054	.001	25	.48
Gill (Riverside Water Co.) . . .	Spring . .	0	74	.005	.010	2.5	1.50	.000	34	.14
Grafton (Water Co.) .	Gravel-packed well at North Grafton	0	92	.000	.011	7.0	.900	.000	35	.07
	Dug wells at Grafton . .	0	90	.001	.023	9.3	2.70	.000	44	.05
Granville (Center Water Co.) . .	Well and springs	0	38	.001	.008	1.4	.080	.002	13	.07
Great Barrington (Fire District) .	New infiltration gallery near Green River .	0	92	.012	.038	1.2	.166	.001	75	.07
Greenfield . .	Dug well near Green River .	1	62	.000	.012	1.4	.120	.000	39	.07
Groton (Water Co.) .	Dug well . .	2	70	.045	.015	2.6	.040	.000	38	.22
Groton (West Groton Water Supply District) . . .	Tubular wells .	0	52	.000	.004	2.4	.240	.000	30	.08
Hanover . . .	Tubular wells .	0	66	.000	.006	7.1	.156	.000	25	.12
Hardwick (Center) .	Dug well . .	2	51	.001	.005	1.6	.053	.000	23	.67
Hardwick (Gilbertville) . . .	Dug and tubular wells . .	0	84	.001	.011	1.4	.043	.000	41	.09
Hardwick (Wheelwright) . .	Tubular wells .	1	42	.002	.007	3.2	.567	.000	12	.06
Hingham (Water Co.)	Filter galleries .	11	77	.018	.035	7.8	.292	.001	34	.09
Holliston (Water Co.)	Large well .	29	56	.027	.090	4.1	.037	.000	24	.73
Hopedale . .	Milford Water Supply . .									
Hopkinton . .	Tubular wells .	0	66	.000	.007	3.7	1.30	.000	27	.06
Hull	Hingham Water Supply . .									
Kingston . . .	Tubular wells .	0	49	.000	.004	7.3	.272	.000	14	.06
Leicester (Water Supply District) . .	Dug wells .	1	70	.001	.011	3.2	1.00	.000	32	.10
Leicester (Cherry Valley and Rochdale Water District) .	Dug wells . .	11	53	.073	.045	2.6	.040	.000	26	.21
Littleton . . .	Tubular wells .	0	42	.000	.005	2.0	.127	.000	19	.07
LOWELL . . .	Boulevard wells filtered . .	9	52	.003	.019	4.2	.319	.000	24	.35
Manchester . .	Dug and tubular wells . .	2	119	.001	.020	14.5	1.16	.001	32	.50
Mansfield . .	Dug well . .	0	43	.003	.011	3.4	.142	.000	17	.08
Marblehead . .	Inlet of filter .	10	172	.039	.039	18.8	.117	.002	78	1.51
	Dug and tubular wells filtered .	8	183	.001	.038	21.4	.178	.000	86	.15
Marion . . .	Old tubular wells	1	49	.000	.008	7.2	.532	.000	16	.04
	New tubular wells	0	–	.000	.006	23.6	.600	.000	38	.05
Marshfield . .	Tubular wells .	0	48	.001	.006	7.7	.027	.000	9	.06
Marshfield (Humarock Beach) . . .	Tubular wells .	0	84	.000	.005	21.6	.350	.000	19	.12
Mattapoisett . .	Tubular wells .	0	58	.000	.009	8.0	.105	.000	23	.07
Medfield . . .	Tubular wells, tap in town (Supplied from State Hospital) .	0	75	.000	.008	4.0	.092	.000	32	.65
Medway . . .	Tubular wells .	3	87	.088	.015	10.6	1.03	.000	35	.24

Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia		Chlorides	Nitrogen as		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Merrimac	Tubular wells	0	87	.003	.007	6.1	.250	.000	33	.10
Methuen	Lone Tree Hill wells	2	79	.312	.043	5.8	.270	.000	36	.10
Middleborough	Dug well, filtered	13	68	.000	.012	6.9	.460	.000	27	.36
Millbury (Water Co.)	Dug well	0	46	.000	.013	2.8	.200	.000	20	.07
Millis	Dug wells	0	131	.001	.006	10.5	3.50	.000	62	.07
Monson	Old dug well	18	40	.001	.036	2.1	.110	.000	9	.12
	New dug well	0	31	.001	.013	1.9	.085	.000	10	.04
Montague (Montague Village)	Montague Village Springs	3	45	.003	.023	1.9	.060	.000	25	.12
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley)	0	58	.001	.005	17.8	.086	.000	19	.05
Nantucket (Siasconset)	Dug wells	0	66	.000	.007	16.5	.183	.000	24	.13
Natick	Dug well	0	116	.002	.011	11.4	.442	.000	58	.06
Needham	Dug well No. 1	2	84	.001	.028	7.5	1.32	.000	36	.06
	Dug well No. 2	0	85	.000	.011	7.1	1.47	.000	37	.06
	Tubular wells (Great Plain Avenue)	1	129	.010	.026	9.8	1.05	.000	34	.10
NEWTON	Tap in pumping station (treated water)	1	114	.006	.020	7.9	.227	.000	29	.12
	Dug well No. 1	0	76	.002	.017	6.6	.217	.000	35	.06
	Dug well No. 2	0	73	.001	.023	7.6	.207	.000	31	.05
North Attleborough	Dug wells	3	56	.002	.017	5.1	.787	.000	23	.24
Northbridge	Tubular wells (Meadow Pond)	0	40	.002	.007	3.9	.200	.000	17	.05
	Tubular wells (Cook Allen)	0	43	.000	.006	4.0	.220	.000	17	.06
Norton	Tubular wells	2	53	.001	.005	3.4	.060	.000	20	.48
Norwood	Tubular wells	3	94	.005	.011	7.6	.842	.000	40	.93
Oak Bluffs (Cottage City Water Co.)	Springs	0	43	.009	.027	9.3	.147	.000	8	.07
Orange	Crystal Spring	0	39	.019	.028	2.1	.020	–	11	.11
Oxford (Water Co)	Tubular wells	0	51	.001	.007	3.5	.317	.000	22	.05
Palmer (Bondsville Water Co.)	Tubular wells	2	67	.002	.006	3.2	.533	.000	28	.87
(Thorndike)	Hamilton Reservoir	7	43	.003	.039	2.0	.040	–	15	.05
Paxton	Spring	1	31	.012	.020	1.8	.040	.000	13	.08
Pepperell	Tubular wells	0	37	.000	.005	1.8	.020	.000	14	.05
Provincetown	Tubular wells	2	173	.006	.006	66.2	.047	.000	36	.16
Reading	New tubular wells	4	84	.000	.014	5.5	.418	.000	36	.57
Rockport	Tubular wells	0	72	.002	.006	14.4	.400	.000	25	.25
Salisbury (Water Supply Co.)	Old dug well	5	81	.002	.025	6.4	.052	.000	42	.20
	New dug well	6	101	.002	.006	6.7	.052	.000	54	1.06
Scituate	Webster Meadow wells	0	141	.000	.004	36.7	1.24	.000	72	.10
	Bound Brook well	6	142	.000	.024	22.8	1.20	.000	46	.05
Sharon	Dug well	0	198	.000	.007	35.3	4.05	.000	93	.09
	Tubular wells	0	65	.002	.004	6.4	.862	.000	27	.09
Sheffield (Water Co.)	Smith's Spring	0	31	.003	.003	1.2	.033	.000	18	.08
Shirley (Village Water District)	Dug wells	0	75	.000	.004	6.8	3.10	.000	27	.06
Shrewsbury	Tubular wells (South Street)	1	61	.001	.020	3.9	.687	.000	26	.07
	Tubular wells (Oak Street)	1	61	.000	.008	4.3	.195	.000	27	.04
Somerset	Tubular wells	17	138	.001	.021	6.7	.170	.000	34	.45
South Hadley (Fire District No. 2)	Dug wells	0	59	.000	.005	2.9	.300	.000	26	.06
Stockbridge (Hill Water Co.)	Springs	0	70	.001	.005	1.3	.063	.000	46	.08
Sturbridge	Tubular wells	3	58	.001	.004	4.1	.276	.000	22	.59
Sutton (Water Co.)	Dug and tubular wells	0	111	.003	.023	4.7	2.57	.001	51	.08
Tisbury	Tashmoo Spring	0	46	.000	.005	10.7	.040	.000	7	.06
Uxbridge	Tubular wells	0	71	.000	.005	6.7	1.70	.003	27	.08
Walpole	Tubular wells	1	59	.001	.009	4.5	.617	.000	25	.07
WALTHAM	Old dug well	8	99	.042	.019	9.6	.179	.000	44	1.79
	New dug well	0	74	.004	.014	6.4	.309	.000	36	.06
Ware	Dug and tubular wells	0	97	.001	.006	6.2	1.46	.001	39	.07
Wareham (Wareham Fire District)	Tubular wells	0	36	.000	.007	6.1	.025	.000	8	.05
Warren (Water District)	Tubular wells	0	36	.000	.005	2.8	.250	.000	13	.11

Averages of Chemical Analyses of Ground-Water Sources, etc.—Concluded

(Parts per Million)

City or Town	Source	Color	Residue on Evaporation	Ammonia: Free	Ammonia: Albuminoid	Chlorides	Nitrogen as: Nitrates	Nitrogen as: Nitrites	Hardness	Iron
Warren (West Warren Water Co.)	Dug wells	17	53	.001	.019	1.8	.133	.000	19	.11
Wayland	Tubular wells	0	103	.003	.004	6.2	.950	.000	44	.05
Webster	Dug and tubular wells	0	46	.013	.015	3.3	.140	.000	23	.07
Wellesley	Tubular wells at pumping station No. 1	5	96	.002	.009	8.5	.525	.000	41	.24
	Dug well at pumping station No. 2	0	87	.001	.005	7.7	.650	.000	38	.06
	Large tubular well at pumping station No. 3	0	86	.001	.004	6.9	.650	.000	37	.13
Westborough	Filter basin	5	33	.006	.062	2.6	.040	–	13	.07
West Brookfield	Tubular wells	0	52	.000	.005	2.4	.050	.000	16	.07
Westford (Water Co.)	Tubular wells (Westford)	0	58	.002	.004	2.2	.033	.000	28	.05
Weston	Tubular wells at Warren Avenue	2	101	.000	.007	6.5	.298	.001	41	.27
	Tubular wells at Kendal Green	0	77	.000	.007	6.1	.525	.000	31	.08
(Glen Farms Water Co.)	Dug wells	5	80	.000	.012	4.0	.160	.000	37	.04
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	1	108	.003	.014	1.1	.036	.000	76	.05
	Blake's Spring	0	146	.000	.004	1.0	.020	.000	129	.05
Westwood (Water Co.)	Dedham Water Supply									
	Tubular wells	0	79	.001	.009	7.1	.757	.000	35	.11
Williamstown (Water Co.)	Cold Spring	0	140	.001	.007	1.1	.233	.001	128	.06
	Sherman Spring	2	89	.015	.053	1.3	.073	.001	56	.07
Wilmington	Tubular wells	0	62	.001	.006	5.2	.504	.000	28	.05
Winchendon	Old dug well	55	43	.044	.038	1.6	.062	.000	15	.22
	New dug well	15	34	.020	.035	1.4	.062	.000	13	.23
WOBURN	Gravel-packed well A	0	149	.022	.026	15.6	.733	.005	63	.06
	Gravel-packed well B	0	125	.049	.023	11.4	.306	.000	58	.05
	Gravel-packed well C	0	97	.000	.021	8.9	.570	.000	43	.06
	Gravel-packed well D	0	82	.005	.019	8.6	.345	.000	41	.05
Worthington (Fire District)	Springs	2	28	.005	.036	1.3	.036	.000	10	.53
Wrentham	Dug and tubular wells	0	65	.000	.005	4.5	2.27	.000	25	.15
Yarmouth	Tubular wells	0	46	.001	.013	13.3	.020	.000	10	.05

Comparison of Water Supplies:

In the year 1930 a policy was adopted for publishing every five years certain tables of average chemical analyses to permit comparison of the various public water supplies of the State. In accordance with this policy the following tables are presented to show comparisons of the color, albuminoid ammonia and hardness in the surface waters and the hardness and iron in the ground waters:

Iron in Ground Waters

(Parts per Million)

City or Town	Source	Iron 1935
Marion	Old tubular wells	.04
Monson	New dug well	.04
Shrewsbury	Tubular wells (Oak Street)	.04
Weston (Glen Farms Water Co.)	Dug wells	.04
Acton (West and South Water Supply District)	Tubular wells	.05
ATTLEBORO	Dug wells and filtered water, South Attleboro	.05
Avon	Dug and tubular wells	.05
Bourne (Sagamore-Ware Tenement Supply)	Tubular wells	.05
Dunstable	Tubular wells	.05
Duxbury (Fire and Water District)	Tubular wells	.05
East Brookfield	Dug well	.05
Edgartown (Water Co.)	Dug and tubular wells	.05

Iron in Ground Waters—Continued

(Parts per Million)

City or Town	Source	Iron 1935
Grafton (Water Co.)	Dug wells at Grafton	.05
Marion	New tubular wells	.05
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	.05
NEWTON	Dug well No. 2	.05
Northbridge	Tubular wells (Meadow Pond)	.05
Oxford (Water Co.)	Tubular wells	.05
Palmer (Thorndike)	Hamilton Reservoir	.05
Pepperell	Tubular wells	.05
Scituate	Bound Brook well	.05
Wareham (Wareham Fire District)	Tubular wells	.05
Wayland	Tubular wells	.05
Westford (Water Co.)	Tubular wells (Westford)	.05
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	.05
	Blake's Spring	.05
Wilmington	Tubular wells	.05
WOBURN	Gravel-packed well B	.05
	Gravel-packed well D	.05
Yarmouth	Tubular wells	.05
Bourne		
(Monument Beach)	Tubular wells	.06
(Sagamore Beach)	Tubular wells	.06
Deerfield (Fire District)	Springs	.06
Hardwick (Wheelwright)	Tubular wells	.06
Hopkinton	Tubular wells	.06
Kingston	Tubular wells	.06
Marshfield	Tubular wells	.06
Natick	Dug well	.06
Needham	Dug well No. 1	.06
	Dug well No. 2	.06
NEWTON	Dug well No. 1	.06
Northbridge	Tubular wells (Cook Allen)	.06
Shirley (Village Water District)	Dug wells	.06
South Hadley (Fire District No. 2)	Dug wells	.06
Tisbury	Well	.06
WALTHAM	New dug well	.06
Wellesley	Dug well at pumping station No. 2	.06
Williamstown (Water Co.)	Cold Spring	.06
WOBURN	Gravel-packed well A	.06
	Gravel-packed well C	.06
Ayer	Dug well	.07
Grafton Water Co.	Gravel-packed well at North Grafton	.07
Granville (Center Water Co.)	Well and springs	.07
Great Barrington (Fire District)	New Infiltration gallery near Green River	.07
Greenfield	Dug well near Green River	.07
Littleton	Tubular wells	.07
Mattapoisett	Tubular wells	.07
Millbury (Water Co.)	Dug well	.07
Millis	Dug wells	.07
Oak Bluffs (Cottage City Water Co.)	Springs	.07
Shrewsbury	Tubular wells (South Street)	.07
Walpole	Tubular wells	.07
Ware	Dug and tubular wells	.07
Webster	Dug and tubular wells	.07
Westborough	Filter basin	.07
West Brookfield	Tubular wells	.07
Williamstown (Water Co.)	Sherman Spring	.07
Chatham (Water Co.)	Tubular wells	.08
Easthampton	Tubular wells	.08
Groton (West Groton Water Supply District)	Tubular wells	.08
Mansfield	Dug well	.08
Paxton	Spring	.08
Sheffield (Water Co.)	Smith's Spring	.08
Stockbridge (Hill Water Co.)	Springs	.08
Sutton (Water Co.)	Dug and tubular wells	.08
Uxbridge	Tubular wells	.08
Weston	Tubular wells at Kendal Green	.08
Bedford	Dug well	.09
Belchertown (Water District)	Tubular wells	.09
Cummington	Springs, tap	.09
Dracut (Water Supply District)	Tubular wells, Collinsville	.09
Hardwick (Gilbertville)	Dug and tubular wells	.09
Hingham (Water Co.)	Filter galleries	.09
Sharon	Dug well	.09
	Tubular wells	.09
Amesbury	Tubular wells, filtered	.10
Auburn (Water Co.)	Tubular wells	.10
Fairhaven (Water Co.)	Tubular wells near Mattapoisett River	.10
Leicester (Water Supply District)	Dug wells	.10
Merrimac	Tubular wells	.10
Methuen	Lone Tree Hill wells	.10
Needham	Tubular wells (Great Plain Avenue)	.10
Scituate	Webster Meadow wells	.10
Ashland	New tubular wells	.11
Bourne (Sagamore-Keith Block)	Tubular wells	.11

Iron in Ground Waters—Concluded

(Parts per Million)

City or Town	Source	Iron 1935
Brookline	Tubular wells and filter gallery, filtered	.11
Framingham	Tap in pumping station	.11
Orange	Crystal Spring	.11
Warren (Water District)	Tubular wells	.11
Warren (West Warren Water Co.)	Dug wells	.11
Westwood (Water Co.)	Tubular wells	.11
Bourne (Pocasset-North Shore)	Tubular wells	.12
Bridgewater	Tubular wells	.12
Dracut (Water Supply District)	Tubular wells, Dracut	.12
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	.12
Hanover	Tubular wells	.12
Marshfield (Humarock Beach)	Tubular wells	.12
Monson	Old dug well	.12
Montague (Montague Village)	Montague Village Springs	.12
NEWTON	Tap in pumping station (Treated water)	.12
Cohasset (Water Co.)	Dug well, filtered	.13
Dedham (Water Co.)	Dug and tubular wells	.13
Dudley	Tubular wells	.13
Nantucket (Siasconset)	Dug wells	.13
Wellesley	Large tubular well at pumping station No. 3	.13
Bourne (Pocasset Beach)	Tubular wells	.14
Barnstable (Water Co.)	Tubular wells (old supply)	.14
Canton	Springdale tubular wells	.14
Gill (Riverside Water Co.)	Spring	.14
Douglas	Tubular wells	.15
Marblehead	Dug and tubular wells, filtered	.15
Wrentham	Dug and tubular wells	.15
Provincetown	Tubular wells	.16
Foxborough	Tubular wells	.19
Franklin	Tubular wells	.19
Salisbury (Water Supply Co.)	Old dug well	.20
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	.21
Groton (Water Co.)	Dug well	.22
Winchendon	New dug well	.23
Medway	Tubular wells	.24
North Attleborough	Dug wells	.24
Wellesley	Tubular wells at pumping station No. 1	.24
Chatham (Water Co.)	Filter gallery near White Pond	.25
Chelmsford (Water District)	Tubular wells	.25
Rockport	Tubular wells	.25
Bourne (Sagamore Heights)	Tubular wells	.27
Weston	Tubular wells at Warren Avenue	.27
Bourne (Sagamore-Savery Supply)	Tubular wells	.28
Chelmsford (North Chelmsford Fire District)	Tubular wells	.28
Bedford	Tubular wells	.32
Billerica	Gravel-packed wells—Tap in pumping station	.32
Canton	Ward well	.34
Easton (North Easton Village District)	Dug well	.35
LOWELL	Boulevard wells, filtered	.35
Middleborough	Dug well, filtered	.36
Somerset	Tubular wells	.45
Canton	Henry's Spring well	.46
Georgetown	Tubular wells, filtered	.48
Norton	Tubular wells	.48
Manchester	Dug and tubular wells	.50
Worthington (Fire District)	Springs	.53
Ayer	Tubular wells	.55
Reading	New tubular wells	.57
Sturbridge	Tubular wells	.59
Medfield (State Hospital Supply)	Tubular wells, tap in town	.65
Hardwick (Center)	Dug well	.67
Bourne (Sagamore-Knowlton Property)	Tubular wells	.72
Holliston (Water Co.)	Large well	.73
Palmer (Bondsville Water Co.)	Tubular wells	.87
Norwood	Tubular wells	.93
Salisbury (Water Supply Co.)	New dug well	1.06
Georgetown	Tubular wells	1.39
Marblehead	Inlet of filter	1.51
ATTLEBORO	Tubular wells, West Mansfield	1.75
WALTHAM	Old dug well	1.79
Winchendon	Old dug well	2.20
Amesbury	Tubular wells	6.20

Hardness of Ground Waters

(Parts per Million)

City or Town	Source	Hardness 1935
Edgartown (Water Co.)	Dug and tubular wells	6
Chatham (Water Co.)	Tubular wells	7
Tisbury	Well	7
Barnstable (Water Co.)	Tubular wells (old supply)	8
Bourne (Sagamore-Keith Block)	Tubular wells	8
Oak (Cottage City Water Co.)	Springs	8
Wareham (Wareham Fire District)	Tubular wells	8

Hardness of Ground Waters—Continued

(Parts per Million)

City or Town	Source	Hardness 1935
Bourne (Sagamore-Ware Tenement Supply)	Tubular wells	9
East Brookfield	Dug well	9
Marshfield	Tubular wells	9
Monson	Old dug well	9
	New dug well	10
Worthington (Fire District)	Springs	10
Yarmouth	Tubular wells	10
Bourne (Sagamore-Knowlton Property)	Tubular wells	11
Chatham (Water Co.)	Filter gallery near White Pond	11
Duxbury (Fire and Water District)	Tubular wells	11
Orange	Crystal Spring	11
Hardwick (Wheelwright)	Tubular wells	12
Bourne (Monument Beach)	Tubular wells	13
Granville (Center Water Co.)	Well and springs	13
Paxton	Spring	13
Warren (Water District)	Tubular wells	13
Westborough	Filter basin	13
Winchendon	New dug well	13
Bedford	Dug well	14
Bourne (Sagamore-Savery Supply)	Tubular wells	14
(Sagamore Heights)	Tubular wells	14
(Sagamore Beach)	Tubular wells	14
Kingston	Tubular wells	14
Pepperell	Tubular wells	14
Bourne (Pocasset Beach)	Tubular wells	15
Dudley	Tubular wells	15
Palmer (Thorndike)	Hamilton Reservoir	15
Winchendon	Old dug well	15
Bedford	Tubular wells	16
Marion	Old tubular wells	16
West Brookfield	Tubular wells	16
Bourne (Pocasset-North Shore)	Tubular wells	17
Mansfield	Dug well	17
Northbridge	Tubular wells (Cook Allen)	17
	Tubular wells (Meadow Brook)	17
Sheffield (Water Co.)	Smith's Spring	18
Littleton	Tubular wells	19
Marshfield (Humarock Beach)	Tubular wells	19
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	19
Warren (West Warren Water Co.)	Dug wells	19
ATTLEBORO	Tubular wells, West Mansfield	20
Bridgewater	Tubular wells	20
Millbury (Water Co.)	Dug well	20
Norton	Tubular wells	20
Cummington	Springs, tap	21
Douglas	Tubular wells	21
Franklin	Tubular wells	21
Easton (North Easton Village District)	Dug well	22
Oxford (Water Co.)	Tubular wells	22
Sturbridge	Tubular wells	22
Fairhaven (Water Co.)	Tubular wells near Mattapoisett River	23
Hardwick (Center)	Dug well	23
Mattapoisett	Tubular wells	23
North Attleborough	Dug wells	23
Webster	Dug and tubular wells	23
Chelmsford (North Chelmsford Fire District)	Tubular wells	24
Dracut (Water Supply District)	Tubular wells, Collinsville	24
Foxborough	Tubular wells	24
Georgetown	Tubular wells	24
Holliston (Water Co.)	Large well	24
LOWELL	Boulevard wells, filtered	24
Nantucket (Siasconset)	Dug wells	24
ATTLEBORO	Dug wells and filtered water, South Attleboro	25
Deerfield (Fire District)	Springs	25
Dunstable	Tubular wells	25
Georgetown	Tubular wells, filtered	25
Hanover	Tubular wells	25
Montague (Montague Village)	Montague Village Springs	25
Rockport	Tubular wells	25
Walpole	Tubular wells	25
Wrentham	Dug and tubular wells	25
Ashland	New tubular wells	26
Avon	Dug and tubular wells	26
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	26
Shrewsbury	Tubular wells (South Street)	26
South Hadley (Fire District No. 2)	Dug wells	26
Hopkinton	New tubular wells	27
Middleborough	Dug well, filtered	27
Sharon	Tubular wells	27
Shirley (Village Water District)	Dug wells	27

Hardness of Ground Waters—Concluded

(Parts per Million

City or Town	Source	Hardness 1935
Shrewsbury	Tubular wells (Oak Street)	27
Uxbridge	Tubular wells	27
Canton	Springdale tubular wells	28
Cohasset (Water Co.)	Dug well, filtered	28
Palmer (Bondsville Water Co.)	Tubular wells	28
Westford (Water Co.)	Tubular wells (Westford)	28
Wilmington	Tubular wells	28
Belchertown (Water District)	Tubular wells	29
Billerica	Gravel-packed wells—Tap in pumping station	29
Canton	Henry's Spring well	29
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	29
NEWTON	Tap in pumping station (Treated water)	29
Groton (West Groton Water Supply District)	Tubular wells	30
Canton	Ward well	31
NEWTON	Dug well No. 2	31
Weston	Tubular wells at Kendal Green	31
Leicester (Water Supply District)	Dug wells	32
Manchester	Dug and tubular wells	32
Medfield (State Hospital Supply)	Tubular wells, tap in town	32
Chelmsford (Water District)	Tubular wells	33
Merrimac	Tubular wells	33
Gill (Riverside Water Co.)	Spring	34
Hingham (Water Co.)	Filter galleries	34
Needham	Tubular wells (Great Plain Avenue)	34
Somerset	Tubular wells	34
Grafton (Water Co.)	Gravel-packed well at North Grafton	35
Medway	Tubular wells	35
NEWTON	Dug well No. 1	35
Westwood (Water Co.)	Tubular wells	35
Ayer	Dug well	36
Framingham	Tap in pumping station	36
Methuen	Lone Tree Hill wells	36
Needham	Dug well No. 1	36
Provincetown	Tubular wells	36
Reading	New tubular wells	36
WALTHAM	New dug well	36
Needham	Dug well No. 2	37
Wellesley	Large tubular well at pumping station No. 3	37
Weston (Glen Farms Water Co.)	Dug wells	37
Ayer	Tubular wells	38
Groton (Water Co.)	Dug well	38
Marion	New tubular wells	38
Wellesley	Dug well at pumping station No. 2	38
Greenfield	Dug well near Green River	39
Ware	Dug and tubular wells	39
Norwood	Tubular wells	40
Hardwick (Gilbertville)	Dug and tubular wells	41
Wellesley	Tubular wells at pumping station No. 1	41
Weston	Tubular wells at Warren Avenue	41
WOBURN	Gravel-packed well D	41
Acton (West and South Water Supply District)	Tubular wells	42
Dedham (Water Co.)	Dug and tubular wells	42
Salisbury (Water Supply Co.)	Old dug well	42
Brookline	Tubular wells and filter gallery, filtered	43
WOBURN	Gravel-packed well C	43
Easthampton	Tubular wells	44
Grafton (Water Co.)	Dug wells at Grafton	44
WALTHAM	Old dug well	44
Wayland	Tubular wells	44
Scituate	Bound Brook well	46
Stockbridge (Hill Water Co.)	Springs	46
Dover	Tubular wells	48
Sutton (Water Co.)	Tubular wells	51
Salisbury (Water Supply Co.)	New dug well	54
Auburn (Water Co.)	Tubular wells	55
Williamstown (Water Co.)	Sherman Spring	56
Dracut (Water Supply District)	Tubular wells, Dracut	57
Natick	Dug well	58
WOBURN	Gravel-packed well B	58
Millis	Dug wells	62
Amesbury	Tubular wells	63
	Tubular wells, filtered	63
WOBURN	Gravel-packed well A	63
Scituate	Webster Meadow wells	72
Great Barrington (Fire District)	New Infiltration Gallery near Green River	75
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	76
Marblehead	Inlet of filter	78
	Dug and tubular wells, filtered	86
Sharon	Dug well	93
Williamstown (Water Co.)	Cold Spring	128
West Stockbridge (East Mountain Water Co.)	Blake's Spring	129

Color of Surface Waters

(Parts per Million)

CITY OR TOWN	SOURCE	Color 1935
Adams (Fire District)	Bassett Brook	0
CHICOPEE	Cooley Brook Reservoir, filtered	0
Colrain (Griswoldville)	McClellan Brook Reservoir	0
Colrain (Fire District No. 1)	Mountain Brook Reservoir	0
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	0
Falmouth	Long Pond	0
Sunderland (Water Co.)	Saw Mill Brook Reservoir	0
Williamstown (Water Co.)	Paul Brook	0
Plymouth	Little South Pond	1
Braintree	Great Pond, filtered	2
CAMBRIDGE	Filter effluent	2
CHICOPEE	Morton Brook	2
Greenfield	Glen Brook Lower Reservoir	2
Plymouth	Great South Pond	2
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	2
Wareham (Onset Fire District)	Jonathan Pond	2
West Springfield	Bear Hole Brook Reservoir, filtered	2
Great Barrington (Fire District)	East Mountain Reservoir	3
Hinsdale (Fire District)	Reservoir	3
Lee (Berkshire Water Co.)	Codding Brook Lower Reservoir	3
Williamstown (Water Co.)	Rattlesnake Brook Reservoir	3
Ashburnham	Upper Naukeag Lake	4
Cheshire (Water Co.)	Kitchen Brook Reservoir	4
Great Barrington (Housatonic Water Works Co.)	Long Pond	4
HAVERHILL	Pentucket Lake	4
Lenox (Water Co.)	Woolsey Reservoir	4
Maynard	White Pond	4
NORTH ADAMS	Mount Williams Reservoir	4
PITTSFIELD	Hathaway Reservoir	4
	Sackett Reservoir	4
Rutland	Muschopauge Lake	4
South Hadley (South Hadley Falls Fire District No. 1)	Leaping Well Reservoir	4
Winchester	South Reservoir	4
BROCKTON	Silver Lake	5
Chester	Austin Brook Reservoir	5
Concord	Nagog Pond	5
FALL RIVER	North Watuppa Lake	5
Greenfield	Glen Brook Upper Reservoir	5
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	5
Lenox (Water Co.)	Lower Root Reservoir	5
Lincoln	Sandy Pond	5
MARLBOROUGH	Lake Williams	5
Monterey (Water Co.)	Reservoir	5
NORTH ADAMS	Notch Brook Reservoir	5
Stockbridge (Water Co.)	Lake Averic	5
Winchester	North Reservoir	5
Abington	Big Sandy Pond	6
Blandford (Fire District)	Freeland Brook	6
CAMBRIDGE	Fresh Pond	6
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	6
FITCHBURG	Scott Reservoir	6
	Wachusett Lake	6
HOLYOKE	Whiting Street Reservoir	6
LYNN	Birch Pond	6
Norwood	Buckmaster Pond, filtered	6
Spencer	Shaw Pond	6
TAUNTON	Elder's Pond	6
Winchester	Middle Reservoir	6
Wakefield	Crystal Lake, filtered	6
West Springfield	Bear Hole Brook Reservoir	6
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	6
Clinton	Spring Basin	7
FITCHBURG	Meetinghouse Pond	7
GLOUCESTER	Haskell Reservoir	7
HOLYOKE	Hugh McLean Reservoir	7
	Wright and Ashley ponds	7
LEOMINSTER	Haynes Reservoir	7
Metropolitan Water District	Tap in Revere	7
Montague (Turners Falls Fire District)	Lake Pleasant	7
PITTSFIELD	Ashley Reservoir	7
Williamsburg	Reservoir	7
WORCESTER	Kendall Reservoir	7
	Lower Holden Reservoir	7
Chester	Horn Pond	8
Metropolitan Water District	Spot Pond	8
Milford (Water Co.)	Dug wells and Charles River, filtered	8
NEWBURYPORT	Dug wells and Artichoke River, filtered	8
NORTH ADAMS	Broad Brook	8
NORTHAMPTON	Mountain Street Reservoir	8
North Andover	Great Pond	8
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	8
WESTFIELD	Winchell Reservoir	8
WORCESTER	Upper Holden Reservoir	8
Amherst (Water Co.)	Atkins Pond	9
Athol	Outlet, Summer Street filters	9
GARDNER	Crystal Lake	9
Hatfield	Running Gutter Brook Reservoir	9

Color of Surface Waters—Continued

(Parts per Million)

City or Town	Source	Color 1935
Metropolitan Water District	Tap in State House	9
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	9
PITTSFIELD	Ashley Lake	9
SPRINGFIELD	Westfield Little River, filtered	9
Stoughton	Muddy Pond	9
Barre	Reservoir	10
Brookfield	Cooley Hill Reservoir	10
Hadley (Water Supply District)	Hart's Brook Reservoir	10
Hudson	Gates Pond	10
LEOMINSTER	Fall Brook Reservoir	10
Metropolitan Water District	Tap in Quincy	10
	Wachusett Reservoir, lower end	10
Northfield (Water Co.)	Minot Brook Reservoir	10
Palmer (Fire District No. 1)	Lower Reservoir (Graves Brook)	10
WESTFIELD	Granville Reservoir	10
WORCESTER	Pine Hill Reservoir	10
HOLYOKE	White Reservoir	11
Huntington (Fire District)	Cold Brook Reservoir	11
PEABODY	Spring Pond	11
WORCESTER	Leicester Reservoir	11
Andover	Haggett's Pond	12
LEOMINSTER	Morse Reservoir	12
Metropolitan Water District	Chestnut Hill Reservoir	12
	Sudbury Reservoir	12
HAVERHILL	Crystal Lake	13
Metropolitan Water District	Framingham Reservoir No. 3	13
Southborough	Sudbury Reservoir	13
FITCHBURG	Lovell Reservoir	14
Hingham (Water Co.)	Accord Pond	14
Metropolitan Water District	Weston Reservoir	14
Northfield (Northfield Schools, Inc.)	Reservoir-East Northfield	14
Orange	Coolidge Brook Reservoir	14
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	14
Clinton	Heywood Pond	15
GLOUCESTER	Wallace Reservoir	15
HAVERHILL	Kenoza Lake	15
Manchester	Gravel Pond	15
Athol	Inlet, Summer Street filters	16
TAUNTON	Assawompsett Pond	16
NEW BEDFORD	Little Quittacas Pond	17
WORCESTER	Kent Reservoir	17
Athol	Buckman Brook Reservoir (Newton Reservoir)	18
Dalton (Fire District)	Tap in Town	18
FITCHBURG	Ashby Reservoir	18
LEOMINSTER	No-Town Reservoir	18
SPRINGFIELD	Cobble Mountain Reservoir	18
Westhampton (Water Co.)	Reservoir	18
WORCESTER	Mann Reservoir	18
Ashfield (Water Co.)	Highland Spring Reservoir	19
FITCHBURG	Falulah Brook	19
PEABODY	Suntaug Lake	19
Ipswich	Dow's Brook Reservoir	20
Clinton	Lower Lynde's Reservoir	21
HOLYOKE	Carmody Reservoir	21
Metropolitan Water District	Lake Cochituate	21
PITTSFIELD	Farnham Reservoir	22
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 4	22
WORCESTER	Quinapoxet Pond	22
PITTSFIELD	Mill Brook	23
Dalton (Fire District)	Cady Brook	24
	Egypt Brook Reservoir	24
Danvers	Swan Pond	24
LYNN	Breeds Pond	24
Metropolitan Water District	Wachusett Reservoir, upper end	24
North Brookfield	Doane Pond	25
Lee (Berkshire Water Co.)	Basin Pond Brook	26
North Brookfield	North Pond	26
Russell	Black Brook Reservoir	26
HAVERHILL	Johnson's Pond	27
NEW BEDFORD	Great Quittacas Pond	28
Braintree	Great Pond	29
Weymouth	Great Pond	29
CAMBRIDGE	Lower Hobbs Brook Reservoir	30
Rockport	Cape Pond	30
WESTFIELD	Montgomery Reservoir	30
CAMBRIDGE	Stony Brook Reservoir	32
Randolph	Great Pond	32
WORCESTER	Bottomly Reservoir	34
Dalton (Fire District)	Windsor Reservoir	35
GLOUCESTER	Dike's Reservoir	36
LAWRENCE	Merrimack River, filtered	36
LYNN	Walden Pond	37
MARLBOROUGH	Millham Brook Reservoir	39
SALEM	Wenham Lake	39
	Ipswich River at Pumping Station	40
Amherst (Water Co.)	Amethyst Brook—intake Reservoir	41

Color of Surface Waters—Concluded

(Parts per Million)

City or Town	Source	Iron 1935
GLOUCESTER	Babson Reservoir	44
Danvers	Middleton Pond	45
CAMBRIDGE	Upper Hobbs Brook Reservoir	47
Athol	Outlet of Mechanical Filter	50
Metropolitan Water District	Ware River at Coldbrook intake	52
Athol	Phillipston Reservoir	53
Metropolitan Water District	Hopkinton Reservoir	53
	Ashland Reservoir	54
LYNN	Hawkes Pond	56
Metropolitan Water District	Framingham Reservoir No. 2	61
HAVERHILL	Millvale Reservoir	73
Northborough	Lower Reservoir (Cold Harbor Brook)	74
Ipswich	Bull Brook Reservoir	92
SALEM	Longham Reservoir	104
Athol	Thousand Acre Meadow Brook	138

Albuminoid Ammonia in Surface Waters

(Parts per Million)

City or Town	Source	Albuminoid Ammonia 1935
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	.009
Monterey (Water Co.)	Reservoir	.011
Blandford (Fire District)	Freeland Brook	.014
CHICOPEE	Cooley Brook Reservoir, filtered	.014
Sunderland (Water Co.)	Saw Mill Brook Reservoir	.014
Colrain (Fire District No. 1)	Mountain Brook Reservoir	.015
Hatfield	Running Gutter Brook Reservoir	.017
Northfield (Water Co.)	Minot Brook Reservoir	.017
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	.019
CHICOPEE	Morton Brook	.022
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	.022
Williamstown (Water Co.)	Rattlesnake Brook Reservoir	.022
Milford (Water Co.)	Dug wells and Charles River, filtered	.023
Williamstown (Water Co.)	Paul Brook	.025
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	.028
Ashburnham	Upper Naukeag Lake	.029
West Springfield	Bear Hole Brook Reservoir, filtered	.029
Colrain (Griswoldville)	McClellan Brook Reservoir	.030
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	.030
Hinsdale (Fire District)	Reservoir	.032
NORTH ADAMS	Notch Brook Reservoir	.032
Lee (Berkshire Water Co.)	Codding Brook Lower Reservoir	.034
Huntington (Fire District)	Cold Brook Reservoir	.035
PITTSFIELD Reservoir	Sackett	.036
Cheshire (Water Co.)	Kitchen Brook Reservoir	.037
Athol	Outlet, Summer Street filters	.039
Greenfield	Glen Brook Upper Reservoir	.039
Lenox (Water Co.)	Woolsey Reservoir	.042
SPRINGFIELD	Westfield Little River, filtered	.042
Palmer (Fire District No. 1)	Lower Reservoir (Graves Brook)	.043
NORTH ADAMS	Mount Williams Reservoir	.044
Stoughton	Muddy Pond	.046
PITTSFIELD	Hathaway Reservoir	.047
Great Barrington (Fire District)	East Mountain Reservoir	.048
WESTFIELD	Winchell Reservoir	.048
Greenfield	Glen Brook Lower Reservoir	.050
NORTH ADAMS	Broad Brook	.050
CAMBRIDGE	Filter effluent	.051
Metropolitan Water District	Tap in Quincy	.051
NORTHAMPTON	Mountain Street Reservoir	.052
GLOUCESTER	Haskell Reservoir	.053
Montague (Turners Falls Fire District)	Lake Pleasant	.053
Adams	Bassett Brook	.056
WESTFIELD	Granville Reservoir	.059
Orange	Coolidge Brook Reservoir	.063
Westhampton (Water Co.)	Reservoir	.063
Clinton	Spring Basin	.064
West Springfield	Bear Hole Brook Reservoir	.065
Lenox (Water Co.)	Lower Root Reservoir	.068
Wareham (Onset Fire District)	Jonathan Pond	.068
Wakefield	Crystal Lake, filtered	.070
Ashfield (Water Co.)	Highland Spring Reservoir	.071
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	.071
WORCESTER	Lower Holden Reservoir	.071
Dalton (Fire District)	Tap in town	.073
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	.073
Hadley (Water Supply District)	Hart's Brook Reservoir	.075
Barre	Reservoir	.076
Braintree	Great Pond, filtered	.076
Falmouth	Long Pond	.076
LEOMINSTER	Fall Brook Reservoir	.076
Metropolitan Water District	Weston Reservoir	.076
Norwood	Buckmaster Pond, filtered	.077
Southborough	Sudbury Reservoir	.077

Albuminoid Ammonia in Surface Waters—Continued

(Parts per Million)

City or Town	Source	Albuminoid Ammonia 1935
PITTSFIELD	Ashley Lake	.078
FITCHBURG	Wachusett Lake	.080
Lincoln	Sandy Pond	.080
Lee (Berkshire Water Co.)	Basin Pond Brook	.083
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	.083
Metropolitan Water District	Tap in Revere	.084
Winchester	South Reservoir	.084
WORCESTER	Upper Holden Reservoir	.084
BROCKTON	Silver Lake	.088
Russell	Black Brook Reservoir	.088
Dalton (Fire District)	Egypt Brook Reservoir	.089
Manchester	Gravel Pond	.091
Metropolitan Water District	Wachusett Reservoir, lower end	.091
FITCHBURG	Lovell Reservoir	.092
HOLYOKE	Wright and Ashley ponds	.092
Amherst (Water Co.)	Amethyst Brook—intake Reservoir	.093
Athol	Buckman Brook Reservoir (Newton Reservoir)	.093
HOLYOKE	Hugh McLean Reservoir	.094
Chester	Austin Brook Reservoir	.095
Metropolitan Water District	Chestnut Hill Reservoir	.095
	Tap in State House	.095
Northfield (Northfield Schools, Inc.)	Reservoir-East Northfield	.095
Winchester	North Reservoir	.097
Metropolitan Water District	Wachusett Reservoir, upper end	.099
PITTSFIELD	Ashley Reservoir	.099
	Farnham Reservoir	.099
LAWRENCE	Merrimack River, filtered	.101
Metropolitan Water District	Framingham Reservoir No. 3	.102
LEOMINSTER	Haynes Reservoir	.103
Athol	Inlet, Summer Street filters	.104
NEWBURYPORT	Dug wells and Artichoke River, filtered	.105
Williamsburg	Reservoir	.105
WORCESTER	Kendall Reservoir	.105
	Leicester Reservoir	.105
Spencer	Shaw Pond	.106
GLOUCESTER	Wallace Reservoir	.107
SPRINGFIELD	Cobble Mountain Reservoir	.107
Abington	Big Sandy Pond	.108
LEOMINSTER	Morse Reservoir	.108
Metropolitan Water District	Spot Pond	.108
LEOMINSTER	No-Town Reservoir	.109
Maynard	White Pond	.109
WORCESTER	Quinapoxet Pond	.109
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 4	.110
FALL RIVER	North Watuppa Lake	.112
PITTSFIELD	Mill Brook	.112
Hudson	Gates Pond	.113
Weymouth	Great Pond	.113
GLOUCESTER	Dike's Reservoir	.114
Stockbridge (Water Co.)	Lake Averic	.114
FITCHBURG	Falulah Brook	.115
HAVERHILL	Kenoza Lake	.115
Plymouth	Great South Pond	.115
Metropolitan Water District	Sudbury Reservoir	.116
Rutland	Muschopauge Lake	.117
South Hadley (South Hadley Falls Fire District No. 1)	Leaping Well Reservoir	.117
FITCHBURG	Ashby Reservoir	.118
	Meetinghouse Pond	.119
TAUNTON	Elder's Pond	.121
WESTFIELD	Montgomery Reservoir	.121
CAMBRIDGE	Fresh Pond	.122
HOLYOKE	White Reservoir	.123
HAVERHILL	Johnson's Pond	.124
HOLYOKE	Whiting Street Reservoir	.124
HAVERHILL	Crystal Lake	.125
LYNN	Birch Pond	.125
Chester	Horn Pond	.127
FITCHBURG	Scott Reservoir	.127
WORCESTER	Pine Hill Reservoir	.130
Clinton	Heywood Pond	.131
HOLYOKE	Carmody Reservoir	.131
Andover	Haggett's Pond	.133
Dalton (Fire District)	Cady Brook	.133
HAVERHILL	Pentucket Lake	.133
Metropolitan Water District	Lake Cochituate	.134
Hingham (Water Co.)	Accord Pond	.135
NEW BEDFORD	Little Quittacas Pond	.135
Metropolitan Water District	Ashland Reservoir	.136
NEW BEDFORD	Great Quittacas Pond	.136
GLOUCESTER	Babson Reservoir	.137
Metropolitan Water District	Hopkinton Reservoir	.137
Braintree	Great Pond	.138
MARLBOROUGH	Millham Brook Reservoir	.139
Great Barrington (Housatonic Water Works Co.)	Long Pond	.142

Albuminoid Ammonia in Surface Waters—Concluded

(Parts per Million)

City or Town	Source	Albuminoid Ammonia 1935
PEABODY	Spring Pond	.142
SALEM	Ipswich River at Pumping Station	.142
North Andover	Great Pond	.143
Concord	Nagog Pond	.144
TAUNTON	Assawompsett Pond	.144
WORCESTER	Kent Reservoir	.146
GARDNER	Crystal Lake	.148
Ipswich	Dow's Brook Reservoir	.149
MARLBOROUGH	Lake Williams	.150
Metropolitan Water District	Ware River at Coldbrook intake	.150
WORCESTER	Mann Reservoir	.150
Plymouth	Little South Pond	.152
Danvers	Middleton Pond	.153
	Swan Pond	.154
WORCESTER	Bottomly Reservoir	.155
Clinton	Lower Lynde's Reservoir	.157
Winchester	Middle Reservoir	.157
HAVERHILL	Millvale Reservoir	.159
PEABODY	Suntaug Lake	.160
CAMBRIDGE	Stony Brook Reservoir	.162
SALEM	Wenham Lake	.165
LYNN	Breeds Pond	.167
Metropolitan Water District	Framingham Reservoir No. 2	.170
Northborough	Lower Reservoir (Cold Harbor Brook)	.178
Brookfield	Cooley Hill Reservoir	.180
Ipswich	Bull Brook Reservoir	.182
North Brookfield	Doane Pond	.185
Dalton (Fire District)	Windsor Reservoir	.194
LYNN	Walden Pond	.194
Athol	Outlet of Mechanical Filter	.197
CAMBRIDGE	Lower Hobbs Brook Reservoir	.201
Rockport	Cape Pond	.202
CAMBRIDGE	Upper Hobbs Brook Reservoir	.203
Athol	Phillipston Reservoir	.205
	Thousand Acre Meadow Brook	.220
North Brookfield	North Pond	.223
LYNN	Hawkes Pond	.232
Amherst (Water Co.)	Atkins Pond	.243
SALEM	Longham Reservoir	.297

Hardness of Surface Waters

(Parts per Million)

City or Town	Source	Hardness 1935
FITCHBURG	Lovell Reservoir	5
	Wachusett Lake	5
LEOMINSTER	Fall Brook Reservoir	5
	Haynes Reservoir	5
	Morse Reservoir	5
	No-Town Reservoir	5
Plymouth	Little South Pond	5
	Great South Pond	5
Falmouth	Long Pond	6
FITCHBURG	Scott Reservoir	6
GLOUCESTER	Haskell Reservoir	6
Hinsdale (Fire District)	Reservoir	6
Wareham (Onset Fire District)	Jonathan Pond	6
WESTFIELD	Montgomery Reservoir	6
Amherst (Water Co.)	Atkins Pond	7
Ashburnham	Upper Naukeag Lake	7
FITCHBURG	Falulah Brook	7
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	7
Spencer	Shaw Pond	7
WESTFIELD	Winchell Reservoir	7
Weymouth	Great Pond	7
Abington	Big Sandy Pond	8
Athol	Buckman Brook Reservoir (Newton Reservoir)	8
	Outlet, Summer Street filters	8
BROCKTON	Silver Lake	8
FITCHBURG	Ashby Reservoir	8
	Meetinghouse Pond	8
GLOUCESTER	Babson Reservoir	8
	Dike's Reservoir	8
Montague (Turners Falls Fire District)	Lake Pleasant	8
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 4	8
WESTFIELD	Granville Reservoir	8
WORCESTER	Upper Holden Reservoir	8
Athol	Inlet, Summer Street filters	9
Brookfield	Cooley Hill Reservoir	9
Concord	Nagog Pond	9
GLOUCESTER	Wallace Reservoir	9
Lincoln	Sandy Pond	9

Hardness of Surface Waters—Continued

(Parts per Million)

CITY OR TOWN	SOURCE	Hardness 1935
NEW BEDFORD	Great Quittacas Pond	9
North Brookfield	North Pond	9
Orange	Coolidge Brook Reservoir	9
TAUNTON	Elder's Pond	9
WORCESTER	Lower Holden Reservoir	9
Amherst (Water Co.)	Amethyst Brook—intake Reservoir	10
NEW BEDFORD	Little Quittacas Pond	10
TAUNTON	Assawompsett Pond	10
Athol	Thousand Acre Meadow Brook	11
Dalton (Fire District)	Egypt Brook Reservoir	11
FALL RIVER	North Watuppa Lake	11
Hingham (Water Co.)	Accord Pond	11
Hudson	Gates Pond	11
Maynard	White Pond	11
Metropolitan Water District	Hopkinton Reservoir	11
	Ware River at Coldbrook intake	11
Northborough	Lower Reservoir (Cold Harbor Brook)	11
North Brookfield	Doane Pond	11
Stoughton	Muddy Pond	11
Athol	Phillipston Reservoir	12
South Hadley (South Hadley Falls Fire District No. 1)	Leaping Well Reservoir	12
WORCESTER	Leicester Reservoir	12
	Quinapoxet Pond	12
Athol	Outlet of Mechanical Filter	13
Barre	Reservoir	13
Clinton	Heywood Pond	13
LAWRENCE	Merrimack River, filtered	13
Manchester	Gravel Pond	13
Metropolitan Water District	Wachusett Reservoir, upper end	13
	Wachusett Reservoir, lower end	13
Northfield (Water Co.)	Minot Brook Reservoir	13
Russell	Black Brook Reservoir	13
SPRINGFIELD	Cobble Mountain Reservoir	13
WORCESTER	Kendall Reservoir	13
HOLYOKE	Carmody Reservoir	14
	White Reservoir	14
Metropolitan Water District	Ashland Reservoir	14
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	14
SPRINGFIELD	Westfield Little River, filtered	14
WORCESTER	Mann Reservoir	14
	Pine Hill Reservoir	14
Blandford (Fire District)	Freeland Brook	15
Huntington (Fire District)	Cold Brook Reservoir	15
MARLBOROUGH	Millham Brook Reservoir	15
Metropolitan Water District	Weston Reservoir	15
Rutland	Muschopauge Lake	15
Southborough	Sudbury Reservoir	15
WORCESTER	Bottomly Reservoir	15
	Kent Reservoir	15
Danvers	Middleton Pond	16
HAVERHILL	Crystal Lake	16
Ipswich	Dow's Brook Reservoir	16
Metropolitan Water District	Chestnut Hill Reservoir	16
	Sudbury Reservoir	16
	Spot Pond	16
Rockport	Cape Pond	16
Chester	Austin Brook Reservoir	17
	Horn Pond	17
Clinton	Lower Lynde's Reservoir	17
Danvers	Swan Pond	17
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	17
Metropolitan Water District	Framingham Reservoir No. 3	17
	Tap in State House	17
	Tap in Revere	17
	Tap in Quincy	17
NORTH ADAMS	Broad Brook	17
Palmer (Fire District No. 1)	Lower Reservoir (Graves Brook)	17
Westhampton (Water Co.)	Reservoir	17
Braintree	Great Pond	18
Dalton Fire District	Tap in town	18
Lee (Berkshire Water Co.)	Basin Pond Brook	18
Metropolitan Water District	Framingham Reservoir No. 2	18
PITTSFIELD	Farnham Reservoir	18
	Mill Brook	18
Winchester	Middle Reservoir	18
	South Reservoir	18
Andover	Haggett's Pond	19
Braintree	Great Pond, filtered	19
HOLYOKE	Hugh McLean Reservoir	19
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	19
LYNN	Birch Pond	19
MARLBOROUGH	Lake Williams	19
Randolph	Great Pond	19
Clinton	Spring Basin	20
Lee (Berkshire Water Co.)	Codding Brook Lower Reservoir	20
Northfield (Northfield Schools, Inc.)	Reservoir—East Northfield	20
Adams (Fire District)	Bassett Brook	21

Hardness of Surface Waters—Concluded

(Parts per Million)

City or Town	Source	Hardness 1935
Hadley (Water Supply District)	Hart's Brook Reservoir	21
North Andover	Great Pond	21
Norwood	Buckmaster Pond, filtered	21
Winchester	North Reservoir	21
CHICOPEE	Morton Brook	22
HAVERHILL	Pentucket Lake	22
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	22
	Mountain Street Reservoir	22
SALEM	Longham Reservoir	22
CAMBRIDGE	Upper Hobbs Brook Reservoir	23
GARDNER	Crystal Lake	23
PEABODY	Suntaug Lake	23
Williamsburg	Reservoir	23
HAVERHILL	Millvale Reservoir	24
HOLYOKE	Wright and Ashley ponds	24
PITTSFIELD	Ashley Lake	24
CAMBRIDGE	Lower Hobbs Brook Reservoir	25
CHICOPEE	Cooley Brook Reservoir, filtered	25
Ipswich	Bull Brook Reservoir	25
LYNN	Breeds Pond	25
PEABODY	Spring Pond	25
CAMBRIDGE	Stony Brook Reservoir	26
Dalton Fire District	Windsor Reservoir	26
HAVERHILL	Johnson's Pond	26
	Kenoza Lake	26
NEWBURYPORT	Dug wells and Artichoke River, filtered	27
Dalton Fire District	Cady Brook	28
LYNN	Walden Pond	29
Metropolitan Water District	Lake Cochituate	29
SALEM	Wenham Lake	29
Wakefield	Crystal Lake, filtered	29
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	29
LYNN	Hawkes Pond	30
Milford (Water Co.)	Dug wells and Charles River, filtered	30
Ashfield (Water Co.)	Highland Spring Reservoir	31
Hatfield	Running Gutter Brook Reservoir	31
PITTSFIELD	Ashley Reservoir	31
Cheshire (Water Co.)	Kitchen Brook Reservoir	34
HOLYOKE	Whiting Street Reservoir	34
Greenfield	Glen Brook Upper Reservoir	35
	Glen Brook Lower Reservoir	37
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	37
West Springfield	Bear Hole Brook Reservoir	38
	Bear Hole Brook Reservoir, filtered	38
CAMBRIDGE	Fresh Pond	39
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	40
CAMBRIDGE	Filter effluent	41
Sunderland (Water Co.)	Saw Mill Brook Reservoir	43
Colrain (Griswoldville)	McClellan Brook Reservoir	49
Stockbridge (Water Co.)	Lake Averic	50
SALEM	Ipswich River at Pumping Station	51
Williamstown (Water Co.)	Paul Brook	54
NORTH ADAMS	Notch Brook Reservoir	55
	Mount Williams Reservoir	55
Lenox (Water Co.)	Woolsey Reservoir	57
Colrain (Fire District No. 1)	Mountain Brook Reservoir	61
Great Barrington (Fire District)	East Mountain Reservoir	61
PITTSFIELD	Sackett Reservoir	66
Lenox (Water Co.)	Lower Root Reservoir	67
Williamstown (Water Co.)	Rattlesnake Brook Reservoir	70
Great Barrington (Housatonic Water Works Co.)	Long Pond	72
Monterey (Water Co.)	Reservoir	77
PITTSFIELD	Hathaway Reservoir	81

Sanitary Protection of Public Water Supplies

During the year 1935 rules and regulations were adopted by the Department in accordance with Section 160 of Chapter 111 of the General Laws for the sanitary protection of the waters used as sources of water supply by the towns of Clinton and North Brookfield, and rules and regulations were re-adopted for the towns of Holden and Rutland and Weymouth, while in the Manchester rules and regulations Rule 13 was amended.

The cities, towns, fire and water districts, and water companies, for which rules and regulations have been adopted by the Department are as follows:

Abington and Rockland	1927	Ashburnham	1922
Adams (Fire District)	1921	Ashfield (Water Company)	1923
Amherst (Water Company)	1931	Athol	1934
Andover	1908	Attleboro	1926

Braintree	1913, 1926[2]
Brockton	1905, 1934[2]
Cambridge	1899
Cheshire (Water Company)	1933
Chester (Fire District)	1914
Chicopee	1906
Clinton	1935
Cohasset (Water Company)	1923
Colrain (Fire District)	1932, 1934[2]
Concord	1910
Dalton (Fire District)	1919
Danvers and Middleton	1920
Deerfield (So. Deerfield Water Supply District)	1932
Easthampton	1904
Egremont (So. Egremont Water Company)	1932
Fall River	1907
Falmouth	1930
Fitchburg	1903, 1907, 1918[2]
Gardner	1910
Gloucester	1930
Great Barrington (Housatonic Water Works Company)	1929
Greenfield	1904
Hatfield	1934
Haverhill	1921
Hingham and Hull (Hingham Water Company)	1912
Holden	1914, 1935[2]
Holyoke	1908, 1918[2]
Hudson	1929
Lakeville (State Sanatorium)	1926
Lee (Berkshire Water Company)	1919
Leicester (Cherry Valley and Rochdale Water District)	1914
Lenox (Water Company)	1933
Leominster	1919, 1927[2]
Lincoln and Concord	1903
Lynn	1907
Manchester	1934[1]
Marlborough	1901
Maynard	1907
Medfield (State Hospital)	1922
Metropolitan Water District	1925
Milford (Water Company)	1924
Montague (Turners Falls Fire District)	1908
New Bedford	1932
Newburyport	1921
Norfolk (State Hospital)	1926
Northampton	1904
North Andover	1912
Northborough	1905, 1934[2]
North Brookfield	1935
Norwood	1901
Palmer (Fire District No. 1)	1933
Peabody	1922
Pittsfield	1903, 1909[2]
Plymouth	1908
Randolph and Holbrook	1926
Rockport	1902
Russell	1910
Rutland	1914, 1935[2]
Salem and Beverly	1901
Scituate	1927
Southbridge (Southbridge Water Supply Company)	1931
Spencer	1934
Springfield	1904, 1910[2]
Stockbridge (Water Co.)	1910
Taunton	1932
Wakefield	1904
Westborough	1929
Westfield	1922
West Springfield	1907
Weymouth	1903, 1935[2]
Williamsburg	1914
Winchester	1909
Worcester	1926

During the year 1935 the Department considered seven applications for its approval concerning the acquisition of land for protecting sources of water supply, approval in each of these cases being given in accordance with Chapter 40, Section 41, of the General Laws after a hearing. The lands approved for acquisition are as follows:

PURCHASE OR TAKING OF LAND DURING THE YEAR 1935 FOR THE PURPOSE OF PROTECTING SOURCES OF WATER SUPPLY

WATER SUPPLY OF	SOURCE OF SUPPLY		Location of Land	Approximate Area of Land in Proposed Taking (Acres)
	Source	Location		
Salem and Beverly	Wenham Lake	Beverly and Wenham	Wenham	1.75 ±
Holyoke and Southampton	Fomer Reservoir on Manhan River	Southampton	Southampton	102.5 ±
Holyoke	Ashby Reservoir	Holyoke	Holyoke	6.6 ±
Clinton and Lancaster	Heywood Reservoir	Sterling	Sterling	44.0 ±
Kingston	Tubular Wells	Kingston	Kingston	37.8 ±
Leominster	Simonds Pond	Fitchburg	Fitchburg	32.0 ±
Amherst	Intake Reservoir on Amethyst Brook	Pelham	Pelham	7.7 ± and right-of-way

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[1] Rule 13 amended in 1935.

[2] Readopted.

Consumption of Water

The water consumption records submitted to the Department from various cities and towns for the year 1935 show that there has been a slight decrease in the amount of water consumed during this year over that of the year 1934. This decrease probably was due chiefly to the reasonably mild winter of 1934–35. Because of the deficiency in rainfall, particularly in the months of July and August, there was a shortage of water supply in the town of Millbury, and the Department authorized a temporary taking by the Millbury Water Company from the works of the city of Worcester under Section 40 of Chapter 40 of the General Laws. The sources of water supply of this company are inadequate to meet the water consumption demands during periods of minimum rainfall, and the Department has recommended that additional sources of supply be provided at an early date.

There was no water diverted in 1935 from the Ware-Swift River works into Wachusett Reservoir and this reservoir reached the low level of 12.76 feet below the top of the flashboards in November of 1935. This is the lowest level which this reservoir has reached during the past three years and represents approximately 6,936.5 million gallons removed from storage. During the months of March, April, May and June about 6,342.8 million gallons of water were wasted from this reservoir. There also was a slight wastage in July.

The average daily water consumption in the various cities and towns where records are kept and supplied to this Department, the estimated population in these cities and towns and the per capita water consumption are shown in the following table:

Average Daily Consumption of Water in Various Cities and Towns in 1935

City or Town	Population 1935	Gallons	Gallons per Inhabitant
Metropolitan Water District			
Arlington	38,539	2,218,000	58
Belmont	24,831	1,373,000	55
Boston	817,713	87,868,000	107
Chelsea	42,673	3,329,000	78
Everett	47,228	4,429,000	94
Lexington	10,813	703,000	65
Malden	57,277	3,923,000	68
Medford	61,444	3,598,000	59
Melrose	24,256	1,568,000	65
Milton	18,147	891,000	49
Nahant	1,748	259,000	148
Quincy	76,909	5,055,000	66
Revere	35,319	2,264,000	64
Somerville	100,773	8,696,000	86
Stoneham	10,841	712,000	66
Swampscott	10,480	893,000	85
Watertown	35,827	2,160,000	60
Winthrop	17,001	1,195,000	70
Abington and Rockland	13,586	627,000	46
Acton	2,635	114,000	43
Acushnet	3,951	84,000	21
Agawam	7,206	343,000	48
Amesbury	10,514	640,000	61
Amherst	6,473	577,000	89
Andover	10,542	1,021,000	97
Ashland	2,497	210,000	84
Athol	10,751	622,000	58
Attleboro	21,835	1,239,000	57
Avon	2,362	127,000	54
Ayer	3,861	212,000	55
Barnstable	8,037	489,000	61
Bedford	3,185	141,000	44
Belchertown	3,863	28,000	7
Beverly	25,871	1.629,000	63
Billerica	6,650	306,000	46
Braintree	17,122	1,215,000	71
Bridgewater	9,201	213,000	23
Brockton	62,407	3,375,000	54
Brookline	50,319	4,792,000	95
Cambridge	118,075	12,066,000	102
Canton	6,505	704,000	108
Chatham	2,050	142,000	69
Chelmsford	7,595	233,000	31
Chicopee	41,952	3,554,000	85
Clinton	12,373	767,000	62
Cohasset	3,418	309,000	90
Concord	7,723	654,000	85
Dalton	4,282	1,211,000	283
Danvers and Middleton	15,859	1,193,000	75
Dartmouth	9,424	258,000	27
Dedham	15,371	1,061,000	69
Douglas	2,403	188,000	78
Dracut	6,500	202,000	31
Dudley	4,568	270,000	59
Duxbury	2,244	246,000	110
East Bridgewater	3,670	154,000	42
East Brookfield	945	32,000	34
Easthampton	10,486	844,000	80
East Longmeadow	3,375	88,000	26
Easton	5,294	314,000	59
Edgartown	1,399	130,000	93
Fairhaven	11,005	422,000	38
Fall River	117,414	5,902,000	50
Falmouth	6,537	784,000	120
Fitchburg	41,700	4,205,000	101
Framingham	22,651	1,543,000	68
Franklin	7,494	670,000	89
Gardner	20,397	883,000	43
Gloucester	24,164	1,910,000	79
Grafton	7,681	168,000	22
Greenfield	15,903	1,382,000	87
Groton	2,534	238,000	94
Groveland	2,219	70,000	32
Hanover	2,709	121,000	45
Hanson and Pembroke	4,038	99,000	25
Haverhill	49,516	3,843,000	78
Hingham and Hull	9,949	2,134,000	214
Holden	3,914	292,000	75
Holliston	2,925	95,000	32
Holyoke	56,139	7,365,000	131
Hudson	8,495	403,000	47
Ipswich	6,217	258,000	41
Kingston	2,743	249,000	91
Lancaster	2,590	109,000	42
Lawrence	86,785	5,854,000	67
Lenox	2,706	300,000	111
Littleton	1,530	73,000	48
Longmeadow	5,105	212,000	42
Lowell	100,114	5,521,000	55
Ludlow	8,569	325,000	38
Lynn	100,909	7,320,000	73

Average Daily Consumption of Water in Various Cities and Towns in 1935 —Concluded

City or Town	Population 1935	Gallons	Gallons per Inhabitant
Lynnfield	1,896	38,000	20
Manchester	2,509	394,000	157
Mansfield	6,543	468,000	72
Marblehead	10,173	778,000	76
Marion	1,867	198,000	106
MARLBOROUGH	15,781	650,000	41
Marshfield	2,073	271,000	131
Mattapoisett	1,682	103,000	61
Maynard	7,107	337,000	47
Medfield	4,162	71,000	17
Medway	3,268	237,000	73
Merrimac	2,209	190,000	86
Methuen	21,073	1,224,000	58
Middleborough	8,865	302,000	34
Milford and Hopedale	18,076	814,000	45
Millbury	6,879	833,000	121
Millis	2,098	150,000	71
Montague and Erving	9,250	812,000	88
Nantucket	3,495	603,000	172
Natick	14,394	824,000	57
Needham	11,828	824,000	70
NEW BEDFORD	110,022	9,112,000	83
NEWBURYPORT	14,815	1,310,000	88
NEWTON	66,144	4,784,000	72
NORTH ADAMS	22,085	2,924,000	132
North Andover	7,164	562,000	78
North Attleborough	10,202	809,000	79
Northbridge	10,577	615,000	58
North Brookfield	3,186	337,000	106
Norton	2,925	152,000	52
Norwood	15,574	1,223,000	78
Oak Bluffs	1,657	161,000	97
Oxford	4,249	220,000	52
PEABODY	22,082	2,881,000	130
Pepperell	3,004	248,000	83
PITTSFIELD	47,516	5,605,000	118
Plainville	1,606	86,000	54
Plymouth	13,183	1,200,000	91
Provincetown	4,071	396,000	97
Randolph and Holbrook	10,944	626,000	57
Reading	10,703	680,000	63
Rockport	3,634	383,000	105
Rutland	2,406	220,000	91
SALEM	43,472	4,347,000	100
Salisbury	2,245	285,000	127
Saugus	15,076	874,000	58
Scituate	3,846	534,000	139
Sharon	3,683	369,000	100
Shelburne	1,606	85,000	53
Shirley	2,548	77,000	30
Shrewsbury	7,144	285,000	40
Somerset	5,656	178,000	31
Southborough	2,109	73,000	34
Southbridge	15,786	1,013,000	64
Southwick	1,540	25,000	16
SPRINGFIELD	149,642	14,145,000	95
Stockbridge	1,921	240,000	125
Stoughton	8,478	734,000	87
Sturbridge	1,918	42,000	22
TAUNTON	37,431	2,735,000	73
Tisbury	1,822	264,000	145
Uxbridge	6,397	236,000	37
Wakefield	16,494	735,000	45
Walpole	7,449	1,065,000	143
WALTHAM	40,557	2,287,000	56
Ware	7,727	369,000	48
Wareham	6,047	376,000	62
Warren	3,662	83,000	23
Wayland	3,346	294,000	88
Webster	13,837	717,000	52
Wellesley	13,376	1,058,000	79
West Bridgewater	3,356	169,000	50
West Brookfield	1,258	62,000	49
WESTFIELD	18,788	1,693,000	90
Westford	3,789	166,000	44
Weston	3,848	215,000	56
West Springfield	17,118	1,806,000	106
Weymouth	21,748	1,676,000	77
Whitman	7,591	279,000	37
Wilbraham	2,969	44,800	15
Wilmington	4,493	157,000	35
Winchester	13,371	1,037,000	77
WOBURN	19,695	1,830,000	93
WORCESTER	190,471	14,829,000	78
Wrentham	4,160	155,000	37
Yarmouth	2,095	67,000	32

CLIMATOLOGICAL DATA

The general weather conditions throughout the State in 1935 for each month were as follows: A January thaw caused one of the highest January runoffs of which we have record and was followed by extreme cold and considerable snow. February was quite normal in all respects except that the precipitation was deficient. March was somewhat warmer than usual but it had a large deficiency in precipitation and therefore there was only a slight increase of runoff over the normal. April was slightly colder than usual and the rainfall over most of the State was quite deficient. Two heavy storms in the eastern portion caused very high waters and quite serious flood conditions particularly in the Neponset and Charles river watersheds. Due chiefly to the January thaw there were no unusual high flows in the other rivers within the State. The weather during the month of May was dry and cold, and there were large sections of the State without rainfall for eighteen consecutive days. June was a month of about normal temperature with a large excess of rainfall. During this month water supplies that had been showing signs of depletion were filled and restored.

For the first six months of the year there was an accumulative actual mean temperature deficiency of 6.7 degrees while the accumulative precipitation was 1.53 inches in excess of the normal.

July was warmer than usual and for a part of the month the humidity was very high and quite oppressive. Although no heat records were broken, temperatures for several days in succession were about 90 degrees. There was a deficiency in rainfall during July but of more intensity in the eastern portion of the State.

August was notably deficient in rainfall, except for a comparatively small area in the southeasterly part of the State, and the long time station reports show that only once or twice has there been such a low rainfall as during this month. The average temperature of August was slightly above the normal. The weather during September was slightly colder than the normal, frost occurring in the central portion of the State during the middle of the month. There was an excess of rainfall but hardly one-third enough to make up for the large deficiency in August. The first half of October was much colder than usual but the last half was warm, the month as a whole being practically normal. The deficiency in rainfall for this month was the greatest for any month in the year, few stations reporting much over one inch. The November outstanding feature was the small amount of sunshine and the high temperatures, the records tending to show that there have not been more than three or four milder Novembers in the past forty-five years. The humidity was somewhat above the normal and the precipitation was greatly in excess of the normal and the first snowfall was some ten days later than the normal. The average temperature during December was 27.1 degrees as compared with the normal for this month in the vicinity of Boston which is 32.5 degrees. The sunshine was but 44 per cent of the possible for this month, and the precipitation was again very deficient, only a few stations reporting two inches or over.

For the last six months of the year the accumulative actual mean monthly temperature in this vicinity was about normal while the precipitation was 5.88 inches deficient.

For the year the above normal temperature is 594.9 degrees; the actual for 1935 was 586.6 degrees. The precipitation throughout the State was 4.35 inches deficient.

The average daily mean temperatures in the vicinity of Boston for the winter of 1934–35 were as follows:

	Degrees Fahrenheit		
	Normal	Actual	Excess or Deficiency
December	32.2	28.4	−3.8
January	28.5	23.2	−5.3
February	28.4	27.8	−0.6

There were ten days, January 23 to February 2, when the maximum temperature was less than 29°.

The monthly normal and average mean temperatures for the vicinity of Boston for 1935 are shown in the following table:

	Degrees Fahrenheit				
	Normal	1935		Normal	1935
January	27.9	23.2	July	71.7	72.6
February	28.8	27.8	August	69.9	70.7
March	35.6	38.4	September	63.2	61.4
April	46.4	45.2	October	53.6	53.8
May	57.1	55.5	November	42.0	45.4
June	66.5	65.5	December	32.5	27.1

The following table has been prepared to show the monthly mean and the maximum and minimum temperature for each month in 1935 for Boston, Worcester, Amherst and Pittsfield.

Temperatures

(Degrees Fahrenheit)

1935	BOSTON			WORCESTER			AMHERST			PITTSFIELD		
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
January	23	56	−5	21	56	−17	19	48	−21	17	52	−16
February	28	53	−1	25	51	−11	24	48	−12	21	50	−16
March	38	71	16	37	69	10	36	68	7	33	63	5
April	45	84	28	44	82	21	45	86	23	43	85	21
May	56	85	37	54	84	29	54	85	32	53	83	30
June	66	89	50	65	89	47	66	88	44	65	87	43
July	73	92	58	72	90	52	73	95	51	72	95	48
August	71	90	52	68	91	45	69	92	45	70	93	45
September	61	80	42	60	79	32	59	82	30	57	78	31
October	54	78	32	51	80	24	50	73	23	49	71	24
November	45	71	20	43	70	17	43	70	20	41	69	17
December	27	45	3	25	46	0	25	44	−1	21	45	−6
Year	49	92	−5	47	91	−17	47	95	−21	45	95	−16
Normal	50 (47 yrs.)			48 (39 yrs.)			47 (47 yrs.)			46 (15 yrs.)		

Rainfall

The average rainfall in the State for year ending December 31, 1935, as recorded at seven long-term stations located in different parts of the State, was 40.10 inches which is about 4.35 inches less than the normal. There was a deficiency in rainfall during the months of February, March, May, July, August, October and December. For the first six months of the year there was an excess of 1.53 inches, but there was a large deficiency in rainfall in the following six months amounting to 5.88 inches. During the climatological year ending September 30, 1935, there was a deficiency of 2.24 inches and the accumulated rainfall for the fifteen months from October, 1934, to December, 1935, inclusive, shows a deficiency of 5.90 inches.

The following table shows the normal rainfall as deduced from the records of seven widely-distributed stations having records for more than sixty years; also the rainfall for the year 1935 and the excess or deficiency of precipitation during each month as compared with the normal.

MONTH	Normal Rainfall (Inches)	Rainfall in 1935 (Inches)	Excess or Deficiency in 1935 (Inches)
January	3.76	6.10	+2.34
February	3.57	2.97	−0.60
March	3.93	1.77	−2.16
April	3.71	4.38	+0.67
May	3.56	2.02	−1.54
June	3.34	6.16	+2.82
July	3.72	2.90	−0.82
August	4.13	2.03	−2.10
September	3.58	4.28	+0.70
October	3.67	1.00	−2.67
November	3.85	5.24	+1.39
December	3.63	1.25	−2.38
Totals	44.45	40.10	−4.35

FLOW OF STREAMS

In those streams where records have been kept by this Department for a number of years the average flow during 1935 has been somewhat greater than the normal.

Sudbury River

The average yield of the Sudbury River in the year 1935 was 1.467 cubic feet per second, or 948,000 gallons per day, per square mile of drainage area. The normal flow of this stream for the sixty-one years during which records have been maintained is 1.500 cubic feet per second, or 969,000 gallons per day, per square mile. The average daily yield for the past year during the six driest months, July to December, inclusive, was 136,100 gallons per day per square mile, or 65.2 per cent less than the normal.

The following table shows the relation between the average daily yield of the Sudbury River per square mile in each month of the year 1935 and the normal yield of the river during the past sixty-one years. The drainage area of the Sudbury River at the point of measurement is 75.2 square miles.

Table Showing the Average Daily Yield of the Sudbury River for Each Month in the Year 1935, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1935		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.743	1.126	2.896	1.872	+1.153	+.746
February	2.308	1.492	2.179	1.408	−.129	−.084
March	4.113	2.658	4.230	2.734	+.117	+.076
April	3.112	2.011	4.054	2.620	+.942	+.609
May	1.678	1.084	1.377	.890	−.301	−.194
June	.810	.523	1.687	1.091	+.877	+.568
July	.298	.193	.148	.096	−.150	+.097
August	.317	.205	−.131	−.084	−.448	−.289
September	.417	.270	.167	.108	−.250	−.162
October	.612	.395	−.158	−.102	−.770	−.497
November	1.198	.774	.673	.435	−.525	−.339
December	1.451	.938	.577	.373	−.874	−.565
Average for Whole Year	1.500	.969	1.467	.948	−.033	−.021

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years, 1930–1935, inclusive, together with the average for a period of sixty-one years, are given in the following table:

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area

MONTH	1930			1931			1932			1933		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	2.62	1.113	42.4	3.95	.832	21.0	4.69	1.835	39.1	2.36	1.854	78.5
February	2.52	1.515	60.1	2.57	1.649	64.3	2.59	1.384	53.4	4.09	1.539	37.6
March	3.84	2.584	67.4	5.89	6.159	104.5	5.51	3.288	59.7	7.13	5.245	73.5
April	2.06	1.709	83.0	3.12	3.349	107.5	2.19	3.126	142.9	5.65	6.331	112.1
May	3.07	.722	23.5	3.87	2.120	54.8	1.55	.819	52.8	2.49	1.300	52.1
June	1.62	.077	4.8	7.18	3.405	47.4	3.28	.162	5.0	1.47	.205	13.9
July	4.08	−.041	−1.0	1.66	.557	33.5	1.92	−.175	−9.1	2.13	−.206	−9.7
August	2.49	−.147	−5.9	4.93	.229	4.6	5.21	.056	1.1	3.53	−.137	−3.9
September	0.81	−.313	−38.5	1.19	−.176	−14.8	10.57	2.185	20.7	10.25	2.118	20.7
October	4.37	.052	1.2	2.23	−.048	−2.1	6.59	3.067	46.6	2.98	.954	32.0
November	4.36	.860	19.7	0.95	.074	7.8	5.10	5.030	98.6	1.11	.693	62.4
December	2.56	.251	9.8	3.29	.532	16.1	1.92	1.692	87.7	4.05	1.084	26.8
Totals and averages	34.40	8.382	24.4	40.83	18.682	45.7	51.12	22.469	43.9	47.24	20.980	44.4

Rainfall, in Inches, received and collected on the Sudbury River Drainage Area—Cont.

MONTH	1934			1935			Mean for Sixty-one Years, (1875-1935)		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January	3.85	3.031	78.7	7.01	3.339	47.7	3.97	2.009	50.6
February	4.36	.751	17.2	3.25	2.269	69.9	3.96	2.423	61.1
March	4.73	4.780	101.1	1.82	4.877	267.5	4.23	4.742	112.2
April	3.59	4.720	131.3	5.08	4.516	88.8	3.68	3.472	94.4
May	3.70	2.283	61.7	2.40	1.587	66.1	3.21	1.934	60.3
June	4.53	.791	17.5	5.41	1.883	34.8	3.33	.903	27.1
July	2.91	−.061	− 2.1	1.83	.171	9.3	3.56	.344	9.7
August	2.10	−.058	− 2.8	1.63	−.150	− 9.2	3.78	.366	9.7
September	8.56	1.411	16.5	3.93	.187	4.8	3.61	.466	12.9
October	3.26	1.340	41.0	0.53	−.182	−34.2	3.57	.706	19.8
November	2.68	1.045	38.9	4.98	.751	15.1	3.78	1.336	35.3
December	3.02	1.471	48.7	1.03	.665	64.7	3.69	1.673	45.4
Totals and averages	47.29	21.504	45.5	38.90	19.913	51.2	44.37	20.374	45.9

The following table gives the record of the yield of the Sudbury River in gallons per day per square mile for each of the past six years and the mean for the past sixty-one years:

Yield of the Sudbury River Drainage Area in Gallons per Day per Square Mile[1]

MONTH	1930	1931	1932	1933	1934	1935	Mean for Sixty-one Years, 1875-1935
January	624,000	466,000	1,029,000	1,040,000	1,699,000	1,872,000	1,126,000
February	940,000	1,024,000	830,000	955,000	466,000	1,408,000	1,492,000
March	1,449,000	3,453,000	1,843,000	2,941,000	2,680,000	2,734,000	2,658,000
April	991,000	1,943,000	1,814,000	3,673,000	2,738,000	2,620,000	2,011,000
May	405,000	1,188,000	459,000	729,000	1,280,000	890,000	1,084,000
June	45,000	1,972,000	94,000	119,000	458,000	1,091,000	523,000
July	−23,000	312,000	−98,000	−115,000	−34,000	96,000	193,000
August	−83,000	129,000	31,000	−77,000	−33,000	−84,000	205,000
September	−181,000	−102,000	1,264,000	1,225,000	816,000	108,000	270,000
October	29,000	−27,000	1,719,000	535,000	751,000	−102,000	395,000
November	498,000	43,000	2,914,000	401,000	605,000	435,000	774,000
December	141,000	298,000	949,000	608,000	825,000	373,000	938,000
Average for whole year	399,000	889,000	1,067,000	999,000	1,024,000	948,000	969,000
Average for driest six months	33,000	110,000	578,000	344,000	424,000	136,100	391,200

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[1] The drainage area of the Sudbury River used in making up these records included water surfaces amounting to about 2 per cent of the whole area from 1875 to 1878, inclusive, subsequently increasing by the construction of storage reservoirs to about 3 per cent in 1879, to 3.5 per cent in 1885, to 4 per cent in 1894, and to 6.5 per cent in 1898. The drainage area also contains extensive areas of swampy land, which, though covered with water at times, are not included in the above percentages of water surfaces.

Nashua River

The average yield of the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton during the year 1935 was 1,132,000 gallons per day per square mile of drainage area, or 3.9 per cent above the average for the past 39 years. The average rainfall on this watershed during 1935 was 41.42 inches or 8.3 per cent less than the normal.

The average yield for the six driest months, July to December, inclusive, was 399,150 gallons per day per square mile of drainage area, or 29.7 per cent less than the normal for this period.

There were large deficiencies in the yield during the months of May, August, September, October, November and December. The January yield was the largest ever recorded for this month. There also was an excess over the normal in the months of February, March, April, June and July.

The following table shows the normal yield of the South Branch of the Nashua River by months for the past 39 years, the actual yield in the year 1935 and the excess or deficiency in each month. The drainage area of the Nashua River above the point of measurement was 119 square miles from 1897 to 1907 and 118.19 square miles from 1908 to 1913, inclusive. Since January 1, 1914, the city of Worcester has been diverting water from 9.35 square miles of this drainage area for the supply of that city. The net drainage area tributary to Wachusett Reservoir is now 108.84 square miles.

Table showing the Average Daily Yield of the Nashua River for Each Month in the Year 1935, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1935		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.849	1.195	3.482	2.250	+1.633	+1.055
February	1.974	1.276	2.239	1.447	+ .265	+ .171
March	3.921	2.534	4.273	2.762	+ .352	+ .228
April	3.550	2.295	3.564	2.303	+ .014	+ .008
May	1.993	1.288	1.732	1.119	− .261	− .169
June	1.287	.832	2.069	1.337	+ .782	+ .505
July	.706	.457	.774	.500	+ .068	+ .043
August	.625	.404	.319	.206	− .306	− .198
September	.658	.425	.607	.392	− .051	− .033
October	.759	.490	.306	.198	− .453	− .292
November	1.257	.812	.979	.633	− .278	− .179
December	1.690	1.093	.735	.475	− .955	− .618
Average for whole year	1.687	1.090	1.752	1.132	+ .065	+ .042

The rainfall on the Nashua River watershed and the total yield expressed in inches in depth upon the watershed (inches of rainfall collected) for each of the past six years, 1930 to 1935, inclusive, together with the average for the past 39 years, are given in the following table:

Rainfall, in Inches, received and collected on the Nashua River Drainage Area

MONTH	1930			1931			1932			1933		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January .	2.11	1.156	54.8	3.44	.881	25.6	5.71	3.024	53.0	2.71	2.323	85.8
February .	2.20	1.396	63.5	2.71	1.103	40.7	3.14	1.906	60.7	4.78	2.457	51.4
March . .	3.65	2.146	58.7	5.00	4.545	90.9	5.25	3.218	61.3	5.92	4.677	79.0
April . .	1.88	1.646	87.8	2.98	4.001	134.2	2.10	4.234	201.1	6.39	8.336	130.5
May . .	2.77	1.039	37.5	5.01	2.258	45.1	1.58	1.260	79.7	2.58	1.942	75.2
June . .	2.96	.773	26.1	6.07	3.089	51.0	2.27	.585	25.8	1.93	.742	38.5
July . .	5.72	.808	14.1	2.71	.694	25.6	3.55	.383	10.8	2.16	.401	18.6
August . .	1.69	.399	23.5	6.95	1.083	15.6	4.23	.503	11.9	4.68	.564	12.0
September .	1.91	.406	21.3	2.04	.517	25.3	7.31	.880	12.0	10.88	3.020	27.8
October .	3.55	.655	18.4	2.46	.487	19.8	7.38	2.708	36.7	3.40	1.463	43.1
November .	3.92	.810	20.7	1.35	.546	40.5	5.21	3.992	76.7	1.68	1.034	61.6
December .	2.61	.661	25.4	3.63	1.209	33.3	2.20	1.916	87.2	3.86	1.388	35.9
Totals and averages .	34.97	11.895	34.0	44.35	20.413	46.0	49.93	24.609	49.3	50.97	28.347	55.6

Rainfall, in Inches, received and collected on the Nashua River Drainage Area—Cont.

MONTH	1934			1935			Mean for Thirty-nine Years (1897-1935)		
	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected	Rainfall	Rainfall collected	Per Cent collected
January .	3.87	2.698	69.7	6.80	4.014	59.0	3.73	2.132	57.1
February .	4.11	1.315	32.0	3.63	2.332	64.2	3.80	2.071	54.5
March . .	4.26	5.053	118.7	2.19	4.927	225.5	3.98	4.520	113.6
April . .	4.41	6.111	138.6	4.09	3.971	97.1	3.89	3.961	101.9
May . .	4.21	3.015	71.6	2.67	1.997	74.9	3.30	2.298	69.7
June . .	5.10	1.644	32.3	5.89	2.308	39.2	3.86	1.436	37.2
July . .	2.35	.577	24.6	2.81	.891	31.7	3.93	.814	20.7
August . .	2.40	.245	10.2	2.13	.367	17.2	3.98	.720	18.1
September .	9.64	1.614	16.7	4.63	.678	14.6	3.96	.734	18.5
October .	2.94	1.400	47.6	.73	.352	48.1	3.25	.875	26.9
November .	2.76	1.757	63.7	4.67	1.092	23.4	3.66	1.402	38.3
December .	4.16	2.181	52.4	1.18	.847	71.9	3.83	1.949	50.9
Totals and averages .	50.21	27.610	55.0	41.42	23.776	57.4	45.17	22.913	50.7

The following table gives the record of the yield of the Nashua River watershed in gallons per day per square mile for each of the past six years and the mean for the past 39 years.

Yield of the Nashua River Drainage Area in Gallons per Day per Square Mile[1]

Month	1930	1931	1932	1933	1934	1935	Mean for Thirty-nine Years 1897-1935
January	648,000	494,000	1,695,000	1,302,000	1,513,000	2,250,000	1,195,000
February	867,000	685,000	1,143,000	1,525,000	816,000	1,447,000	1,276,000
March	1,203,000	2,548,000	1,804,000	2,622,000	2,832,000	2,762,000	2,534,000
April	955,000	2,321,000	2,456,000	4,836,000	3,545,000	2,303,000	2,295,000
May	583,000	1,266,000	706,000	1,089,000	1,690,000	1,119,000	1,288,000
June	448,000	1,789,000	339,000	430,000	953,000	1,337,000	832,000
July	453,000	389,000	215,000	225,000	323,000	500,000	457,000
August	224,000	607,000	282,000	316,000	137,000	206,000	404,000
September	235,000	299,000	509,000	1,747,000	933,000	392,000	425,000
October	367,000	273,000	1,518,000	820,000	785,000	198,000	490,000
November	469,000	316,000	2,313,000	599,000	1,018,000	633,000	812,000
December	371,000	678,000	1,074,000	778,000	1,223,000	475,000	1,093,000
Average for Whole Year	566,000	972,000	1,169,000	1,350,000	1,315,000	1,132,000	1,090,000
Average for Driest Six Months	353,000	428,000	597,000	682,300	687,100	399,150	568,000

[1] The drainage area used in making up these records included water surfaces amounting to 2.2 per cent of the whole area from 1897 to 1902, inclusive, to 2.4 per cent in 1903, to 3.6 per cent in 1904, to 4.1 per cent in 1905, to 5.1 per cent in 1906, to 6 per cent in 1907, to 7 per cent in 1908, 1909 and 1910, to 6.5 per cent in 1911, to 6.8 per cent in 1912, to 7 per cent in 1913, to 7.4 per cent in 1914 and 1915, to 7.6 per cent in 1916, to 7.4 per cent in 1917 and 1918, to 7.5 per cent in 1919, 1920, 1921 and 1922, to 7.4 per cent in 1923 and 1924, to 6.4 per cent in 1925, to 5.9 per cent in 1926, to 5.7 per cent in 1927, to 7.6 per cent in 1928, to 7.4 per cent in 1929, to 5.6 per cent in 1930, to 6 per cent in 1931, to 7.3 per cent in 1932, to 7.6 per cent in 1933 to 7.6 per cent in 1934, and 7.6 per cent in 1935.

Merrimack River

The Merrimack River is the second largest stream in the State of Massachusetts. It rises in the White Mountains in the State of New Hampshire and flows southerly through the central part of that state until it enters Massachusetts, where it turns to the east and flows in a general northeasterly direction the remainder of its course to the sea. The total length of its watershed from its extreme northerly limits in the mountains of northern New Hampshire to its extreme southerly limits in the hills of Hopkinton, Massachusetts, is about 137 miles and its extreme width is about 66 miles. The total drainage area above the mouth of the river at Newburyport comprises about 5,000 square miles, of which about one-quarter or 1,250 square miles are within the limits of Massachusetts and three-quarters or 3,750 square miles are within the State of New Hampshire.

Records of the flow of the Merrimack River have been kept continuously at Lawrence in the office of the Essex Company since 1880. The original drainage area of the river at that point was 4,663 square miles and included 118.19 square miles tributary to the South Branch of the Nashua River used for the water supply of the Metropolitan Water District and in part for the city of Worcester, 75.2 square miles on the Sudbury River, and 18 square miles tributary to Lake Cochituate. The flow as measured at Lawrence includes the water wasted from these drainage areas. In presenting the record of the flow of the river these drainage areas have been deducted, leaving the net drainage area above Lawrence 4,567 square miles in 1880, 4,570 square miles in 1891 to 1897, inclusive, and 4,452 square miles since the latter date. The quantity of water overflowing from the Cochituate and Sudbury watersheds as measured by the Metropolitan District Commission also has been deducted from the flow of the river as measured at Lawrence. The average flow of the river during the year 1935 amounted to 1.703 cubic feet per second per square mile, which is about 16.8 per cent more than the normal for the past 56 years. The flow was more than the normal during the months of January, February, March, June, July and December and less than the normal during the months of April, May, August, October and November, while September was about normal. The greatest deficiency occurred in the month of October.

The following table shows the relation between the normal flow of this stream during the past 56 years and the actual flow during each month of the year 1935:

Table Showing the Average Monthly Flow of the Merrimack River at Lawrence for the Year 1935; also the Normal and Departure therefrom in Cubic Feet per Second per Square Mile of Drainage Area.

MONTH	Normal Flow 1880-1935	Actual Flow in 1935	Excess or Deficiency
January	1.292	3.039	+1.747
February	1.338	1.994	+ .656
March	2.695	3.020	+ .325
April	3.616	3.313	− .303
May	2.218	2.025	− .193
June	1.260	2.292	+1.032
July	.757	1.204	+ .447
August	.640	.515	− .125
September	.654	.613	− .041
October	.797	.425	− .372
November	1.142	.859	− .283
December	1.087	1.141	+ .054
Average for whole year	1.458	1.703	+ .245

The following table gives the record of the flow of the Merrimack River at Lawrence for each of the past six years, together with the average flow in the past 56 years, this amount being expressed in cubic feet per second per square mile of drainage area.

Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile

MONTH	1930	1931	1932	1933	1934	1935	Mean for Fifty-six Years 1880-1935
January	.861	.423	1.803	1.333	1.468	3.039	1.292
February	.949	.478	1.301	1.295	1.248	1.994	1.338
March	2.242	1.603	1.363	2.392	2.434	3.020	2.695
April	2.035	3.665	4.454	7.363	6.042	3.313	3.616
May	1.172	1.897	1.319	2.144	2.325	2.025	2.218
June	1.055	2.207	.493	.816	.957	2.292	1.260
July	.521	.756	.499	.406	.479	1.204	.757
August	.520	.520	.483	.509	.450	.515	.640
September	.378	.471	.673	.971	.939	.613	.654
October	.311	.471	1.223	1.367	1.210	.425	.797
November	.562	.621	2.431	1.157	1.475	.859	1.142
December	.518	.973	1.157	1.187	1.591	1.141	1.087
Average for whole year	.927	1.174	1.433	1.745	1.718	1.703	1.458
Average for driest six months	.468	.635	.782	.871	.918	.793	.846

Weekly Flow of the Sudbury, Nashua and Merrimack Rivers

The following table shows the weekly fluctuations during the year 1935 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 118.19 square miles, and of the Merrimack River at Lawrence 4,452 square miles.

Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1935, in Cubic Feet per Second per Square Mile of Drainage Area

WEEK ENDING SUNDAY—	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	WEEK ENDING SUNDAY—	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 6	.811	1.435	1.297	July 7	.117	.556	1.275
13	6.536	8.306	4.451	14	.412	1.578	1.895
20	2.263	2.600	2.976	21	.256	.733	1.019
27	2.314	2.316	3.158	28	.068	.407	.780
Feb. 3	1.711	1.599	2.871	Aug. 4	− .209	.358	.633
10	1.117	1.552	2.103	11	− .081	.312	.561
17	2.309	2.451	1.806	18	− .157	.300	.587
24	1.973	2.087	1.896	25	− .109	.332	.454
Mar. 3	3.676	3.328	1.960	Sept. 1	− .208	.239	.426
10	4.936	4.613	2.327	8	.383	.878	.514
17	5.799	5.611	3.144	15	.425	.902	.809
24	3.725	4.081	3.769	22	.019	.324	.676
31	2.725	3.524	3.273	29	− .006	.459	.509
Apr. 7	1.981	2.124	2.831	Oct. 6	− .248	.240	.546
14	7.386	3.566	2.975	13	− .198	.268	.447
21	5.079	4.441	4.120	20	− .142	.258	.400
28	2.485	2.448	3.359	27	− .139	.339	.337
May 5	1.938	2.094	2.921	Nov. 3	.091	.682	.377
12	2.531	3.118	2.652	10	.030	.535	.436
19	1.278	1.334	2.001	17	.227	.738	1.024
26	.544	.943	1.396	24	.904	.836	.967
June 2	.607	1.177	1.305	Dec. 1	1.676	1.895	1.521
9	.755	1.871	1.449	8	.827	.609	1.407
16	2.514	2.316	2.590	15	.641	1.096	1.138
23	2.400	3.295	2.985	22	.778	.856	1.117
30	1.029	1.066	2.412	29	.237	.374	.782

EXAMINATION OF RIVERS

The principal streams in the State have been examined throughout the year by the engineers with the assistance of the Water and Sewage Laboratories and the Lawrence Experiment Station in the exercise of the oversight of inland waters under Chapter 111 of the General Laws, and during the six months from June to November, inclusive, samples were regularly collected from the more important streams for chemical analysis and dissolved oxygen determinations, while at some sampling points bacterial examinations were made of the samples collected. In general, there was no serious deterioration in the condition of the various streams in spite of the fact that there was a deficiency in rainfall in the months of February, March, May, July, August, October and December and a corresponding decrease in the flow in the streams.

Aberjona River

Complaints were received during the year because of the pollution of the Aberjona River from the overflow of sewage from the North Metropolitan Sewerage System and from a large manufacturing plant on this stream. Because of these conditions, which resulted in serious pollution of a bathing beach in the town of Winchester, an act was passed by the Legislature providing for appropriations for increasing the capacity of the North Metropolitan Sewerage System in the Aberjona and Mystic River Valleys. The results of the analyses show that, in spite of the overflow of sewage and industrial wastes into this river, the river throughout its course has been generally in a more satisfactory condition during much of the year 1935 than during the previous year, and in addition there has been a marked decrease in the iron content of the water in the river. The proposed increase in the capacity of the North Metropolitan Sewerage System, now being provided, under the supervision of the Metropolitan District Commission should result in further improvement in this stream. The Aberjona River sewer was completed to the upper part of the watershed in North Woburn during the year and the condition of the stream in this portion of its course has been greatly improved due to the discharge of tannery wastes from one of the tanneries into the sewer instead of into the stream as in previous years. A further extension to intercept the wastes from a fish dehydrating plant was under consideration during the latter part of the year.

Assabet River

The analyses show that the condition of the Assabet River both below Westborough and in the lower part of its course was similar in most respects during the year 1935 to that in the year 1934. The examinations failed to show any serious overflow of sewage into this river from the town of Hudson as was the case in 1934, but the stream below this town showed evidence of the discharge of oily wastes and below the town of Maynard was in an objectionable condition due to the industrial wastes discharged from this municipality. The analyses show that below the town of Maynard the condition of the river was much less satisfactory during the year 1935 than during the year 1934.

Blackstone River

A very extensive investigation has been carried out during the year 1935 with Federal E.R.A. and W.P.A. funds in connection with the Blackstone River. As a part of this investigation examinations were made at most of the industrial plants in the valley of this river, and chemical analyses were made of certain industrial wastes discharged therefrom. The results of the analyses show that there has been a slight increase in pollution below Worcester and below the sewage disposal works of this city, a condition which is to be expected because of the decrease in the flow of this stream, resulting from the deficiency in rainfall and an increase in industrial activity. The river above the Worcester sewage disposal works, as in previous years, was discolored by industrial wastes containing iron and oil which enter the stream in the city of Worcester. The effluent from the Worcester sewage treatment works has tended to decrease the concentration of iron in the river as was the case in previous years, but there was more iron in the river both above and below the Worcester sewage disposal works than in 1934. A tributary of the Blackstone River, Kettle Brook, in the upper portion of the drainage area was highly discolored by industrial wastes, and the analyses show a considerable increase in the amount of organic matter in this part of the stream.

Charles River

The analyses of samples of water collected in connection with the Charles River show an increase in pollution below the town of Milford, which is to be expected until the additional sewage treatment works now under construction by this town have been put into operation. Mine Brook below Franklin and above the municipal sewage disposal works has shown an increase in pollution due to the industrial wastes discharged into this stream. The effluent discharged into the stream from these municipal sewage disposal works probably helped to increase the pollution. The analyses also show pollution from certain industrial wastes discharged into the stream in the town of Medway. The amount of organic matter in the stream below this town during the year 1935 was in excess of that found during the year 1934. The river at the Watertown dam, which is the lowest point on this stream before its discharge into the Charles River Basin, was in a slightly better condition during the year 1935 than during previous years. The analyses show a considerable increase in pollution in the water of the Charles River Basin. Further deterioration in the quality of the water of this basin may be expected until changes have been made in the sewerage systems having outlets for overflow of sewage into the basin. During the year a Federal Public Works Administration project was approved for the construction of additional sewage treatment works by the town of Milford at a cost of $90,000, plans relative to the construction of these works having been approved by the Department. Construction of the works was commenced on December 16, 1935.

Chicopee River

The Quaboag, Swift and Ware rivers join to form the Chicopee River at Three Rivers in the town of Palmer. The average of the results of the analyses show that there has been no substantial change in the amount of organic matter in the water of all of these streams above their confluence during the year 1935. During the year the sewage disposal works under construction in connection with the disposal of sewage in the town of Spencer were completed. The use of these works should result in an improvement in the condition of the water in the stream below the works. A slight increase in pollution of the Chicopee River near its mouth was noted during the year.

Concord and Sudbury Rivers

During the year the new sewage treatment works for the town of Natick were completed and plans were approved with certain modifications by the Department relative to new sewage treatment works to be constructed by the town of Framingham. These latter plans were approved by the Washington authorities for a Public Works Administration project, but the town of Framingham failed to appropriate the necessary funds for carrying out the work, and it was necessary for the Department to advise the town that unless construction of the proposed works was started by April, 1936, it would be necessary for the Department to refer the matter to the office of the Attorney-General under sections 7 and 13 of Chapter 83 of the General Laws, Tercentenary Edition. Below the village of Saxonville there has been a slight increase in the organic matter in the Sudbury River, and the results of the analyses show that the Concord River at its mouth in the city of Lowell contained a somewhat larger amount of organic matter than during the previous year. It is believed that this condition is due more to a decrease in the flow of the stream than to an increase in pollution, though there has been some indication of increased industrial activity in this valley. During the past year the Department approved plans for the treatment of the wastes of the carpet mills in Saxonville and their ultimate discharge into the sewerage system of the town of Framingham, but up to the end of the year these plans had not been carried out. It is the present practice to discharge these wastes into the Sudbury River with very little treatment.

Connecticut River

The Connecticut River in certain parts of its course has been under investigation during the past year by a group of engineers employed under the Federal E.R.A. and W.P.A. projects, but the results of these examinations are not available to the Department at the time of writing this report. The results of the analyses of samples of water collected under the direction of this Department show that the Mill River below Northampton has been more polluted during the past year than during the previous year and that there has been a slight increase in pollution in the water of the Connecticut River above the city of Holyoke. Below the city of Springfield there also was a slight increase in the amount of organic matter in the water of the river. These increases are to be expected because of the decrease in the flow of the stream during the summer months. The Department has continued to co-operate so far as practicable in connection with the Federal E.R.A. and W.P.A. projects for investigating this stream. During the year a bill was presented to the Legislature providing for an investigation of the condition of the Connecticut River by this Department but it failed in enactment. It was necessary for the Department to advise against using the Connecticut River at Agawam for bathing during the year.

French River

The analyses show that the French River below Webster and Dudley is in a similar condition to that found in 1934. Sewage from Webster and Dudley continues to be discharged into this river without treatment.

Hoosick River

During the year 1935 works for partial treatment of the sewage of the city of North Adams were installed in that city near the Williamstown line. Accordingly, the results of the analyses of samples of the river water collected above these sewage treatment works and below the thickly settled part of the city show an improvement in the condition of the stream, although there was an increase in the amount of organic matter in the stream below the town of Adams. The results of the analyses also show that the water of the river in the town of Williamstown above the Massachusetts-Vermont boundary was in about the same condition as that found in the year 1934, which represents an improvement considering the decrease in the flow of the stream during the months when the samples were collected.

Housatonic River

As in the case of the Connecticut, Blackstone and Nashua rivers an investigation over a number of months was carried out relative to pollution of the Housatonic River under Federal E.R.A. and W.P.A. projects. The Department assisted in this investigation by analyzing samples of the water of the river and industrial wastes discharged from plants in the valley of this stream. The results of the analyses of the samples collected show that in the west branch of the Housatonic River in Pittsfield there was a slight increase in pollution as was the case in the main stream below the city. During the year, the city engaged consulting engineering services in the matter of constructing additional sewage disposal works. Funds have been allocated by the Federal Government under the Public Works Administration for carrying out this work under the plans approved by this Department. Until these works are provided much pollution of the Housatonic River must result from the disposal of sewage from the city of Pittsfield.

Merrimack River

The Merrimack River has been examined during the past year at regular intervals in accordance with Chapter 202 of the Acts of 1929, but the results of these examinations show no considerable change since 1934 in the condition of this stream throughout its course in the State of Massachusetts. It is to be noted, however, that the amount of organic matter present in the river at the regular stations where samples were collected, particularly below Lawrence, was greater than during 1934, a condition which is to be expected in view of the reduction in the flow of the stream. Samples collected above Nashua, New Hampshire, show a considerable increase in pollution over 1934. During the year efforts were made to obtain the passage of legislation to permit the establishment of a Merrimack River Valley Sewerage District for the construction of a trunk sewer from Lowell to the sea. Chapter 446 of the Acts of 1935 was passed authorizing the establishment of such a district provided that $10,000,000 were made available for the construction of the sewer by the Federal Government by January 1, 1936. As these funds were not provided the act became null and void on that date.

Millers River

According to the analyses available to the Department the Millers River below Winchendon was in a more satisfactory condition during the past year than has been the case in recent years, but the analyses showed an increase in pollution in this stream below Gardner.

Nashua River

An extensive investigation was carried out during the past year in connection with the pollution of the Nashua River by a Federal E.R.A. project, later continuing as a W.P.A. project with headquarters at Fitchburg. Sanitary surveys have been made of the North Branch in Fitchburg and vicinity, and samples of industrial wastes discharged from plants along the stream have been collected for analysis. It is the understanding of this Division that this investigation is to be continued during the year 1936 and that certain works projects may originate as a result of this investigation. In general the results of the examination show that the Nashua River in its course through the city of Fitchburg is considerably polluted by industrial wastes.

During the year the sewage of the city of Leominster has been discharged directly into the Nashua River with little or no treatment pending the completion of new sewage treatment works. Accordingly, the results of the analyses show that there has been considerable increase in pollution of the North Branch in and below Fitchburg and from the city of Leominster to its mouth. The stream in certain parts of its course during the past summer was deficient in oxygen. The South Branch of the river below the Clinton sewage disposal works was in about the same condition as that found in 1934, and the main stream below Groton was slightly more satisfactory than during recent years. Throughout the year 1935 satisfactory progress has been maintained in the construction of the new sewage treatment works at Leominster and it is to be expected that a portion of these works will be available for use some time in the fall of 1936. Monoosnoc Brook, during the past year, has shown a great improvement due to the diversion of sewage from the valley of this brook to the Nashua River at the new sewage treatment works of the city of Leominster.

Neponset River

The Neponset River throughout its course during 1935 has shown the improvement to be expected by the use of the Neponset River valley sewer, which was practically completed in 1932, but during the past year the stream below Walpole was in a somewhat less satisfactory condition than in 1934 due to the discharge into the stream of certain wastes from industrial plants in Walpole. There was a reduction in the dissolved oxygen in the lower portions of the river because of the discharge of industrial wastes, especially oily wastes, into the stream. There was also a slight increase in pollution below Mother Brook. In April, 1935, certain individuals interested in fishing in the Neponset River raised the question of pollution, and special investigations have been made of the discharge of industrial wastes into the stream. Conferences have been suggested but at the time of the writing of this report those interested in fishing have not requested a conference.

North River (Salem and Peabody)

During the year 1935 legislation was enacted authorizing the South Essex Sewerage District to construct certain works to assist in the removal of grease from the sewage reaching the Salem and Peabody pumping station, and legislation also was enacted authorizing this district to adopt rules and regulations concerning the character of industrial wastes discharged into the sewerage system. The results of the analyses of samples of water collected from the North River show that it continues to be the most seriously polluted stream in the State. This condition must continue until suitable provisions are made for diverting into the sewer the industrial wastes which now discharge into this stream. It might be added that in the condition found during the year 1935 the North River was in the most objectionable condition ever shown by analyses available to this Department.

Quinebaug River

The Quinebaug River continues to be polluted by certain industrial wastes entering this stream in the town of Southbridge, and untreated sewage from the town. During the year certain improvements were made in the Southbridge sewage treatment works.

Taunton River

The results of the analyses of samples of the Salisbury Plain River below Brockton and of the Coweeset River below the Brockton sewage treatment plant have shown a slight improvement in the condition of these streams. The condition of the Taunton River below Taunton, which last year showed more pollution than in previous years, has again shown an increase in pollution. Mill River in Taunton at its mouth has shown considerable improvement due to a P.W.A. project providing a sewer for the removal of sewage from the valley of this river. The Three Mile River, a tributary of the Taunton River, at its mouth, has shown more evidence of pollution than at any time since records of analyses of samples of this river have been compiled, and at the Taunton River at Berkeley Bridge there also has been a slight increase in pollution over that of previous years. No definite action has been taken relative to the construction of works for the treatment of sewage from the city of Taunton.

Ten Mile River

The analyses of the samples of the Ten Mile River show a slight improvement below North Attleborough and Attleboro in 1935. Improvements in the sewage disposal works at both North Attleborough and Attleboro were completed during the year and may account in a small measure for the improvement in the condition of the stream.

Examinations of the other larger streams in the State have shown no material change in condition during the year.

MUNICIPAL SEWAGE TREATMENT WORKS

In accordance with the duties of the Department under Section 5 of Chapter 111 of the General Laws this Division has examined all of the sewage treatment works in the State during the past year and in connection with these examinations has caused samples of the raw sewage, settled sewage and filter effluents to be collected for analysis.

Attleboro

The work of re-conditioning certain of the sewage filters at Attleboro was completed during the early part of the year. The results of the analyses show that the raw sewage reaching these works was slightly stronger as represented by the albuminoid ammonia content than during the year 1934. The results of the analyses of the effluent indicate a larger percentage of removal of putrescible organic matter. In general these sewage treatment works appeared to be more satisfactorily operated than during recent years, but it is advisable that the beds be properly prepared in the late fall if satisfactory operation is to be maintained during the winter months.

Brockton

The results of the analyses show a very slight falling off in efficiency in 1935 but nevertheless the nitrification has been fairly satisfactory during most of the year. These works have been under expert supervision.

Clinton

The strength of the sewage reaching the sewage treatment works of the town of Clinton, which are located in the town of Lancaster, was considerably less during the year 1935 than during the previous year, the amount of albuminoid ammonia being about equal to that in the year 1932. This improvement is believed due chiefly to a reduction in the amount of distillery waste discharged into the sewerage system during the past year. The effluent from this plant has improved during the past year as a result of the careful operation of these sewage treatment works and the removal from the sewers of certain industrial wastes. In spite of these conditions, however, there is great need of modern treatment works for the disposal of the sewage of the town of Clinton if offensive conditions in the vicinity of the works and the stream into which the effluent is discharged are to be prevented.

Concord

The results of the analyses show that the sewage received at the Concord sewage filters during the year 1935 was similar in most respects to that received at these works for a number of years, and the effluent from these beds discharged into the river appeared to be satisfactory. The number of acres available for filtering the sewage from the town of Concord is about 5.48. Accordingly, the filter beds are operated, on an average, at the rate of about 104,000 gallons per acre per day, which is excessive. During the years 1934 and 1935 three additional filters with an aggregate area of 1.93 acres were partially constructed but at the end of the year these filters had not been put into use. It is important that this additional area be completed and used as early as practicable and that if the amount of sewage to be treated continues to be as great as in recent years additional filters be constructed. The sewage should be distributed more evenly over the entire area than has been the case in the past.

Easthampton

The strength of the sewage treated in connection with the town of Easthampton during the year 1935 was somewhat greater than in the year 1934, and the effluent discharged from the sewage beds into the Manhan River was less satisfactory. As in the case of previous years, probably more than half of the sewage was allowed to discharge into the Manhan River after sedimentation only. Suitable and adequate means of sewage disposal should be provided by the town of Easthampton at the earliest practicable date if pollution of the Manhan River is to cease.

Fitchburg

There has been little or no change in the strength of the sewage reaching the sewage treatment works of the city of Fitchburg during the year 1935. These works have been operated under expert supervision as in previous years, and so far as the results of analyses available to this Department show, the effluent discharged into the North Branch of the Nashua River from these works has been well nitrified and reasonably stable. During the year 1935 construction activities were continued in connection with an additional sludge-drying area, and the reconstruction of the walls of one of the Imhoff tanks was begun but was not completed by the end of the year.

Framingham

As in the case in previous years sewage from Framingham has been discharged into Bannister Brook, a tributary of the Sudbury River, without treatment, and the effluent from the sewage treatment works has shown less purification than in 1934. Because of this condition, the Department sent a notice to the town of Framingham under date of December 11, 1935, requiring the improvement of the sewage disposal works of the town and advising that, unless adequate sewage treatment works were constructed, action by the Department through the office of the Attorney-General would be necessary. Plans for sewage treatment works prepared by the Town Engineer of Framingham were presented to this Department by the Department of Public Works of that town, and on June 11, 1935, a hearing was given by this Department. Following the hearing the Department approved the plans with certain modifications, but at a special town meeting held for the purpose the voters of the town refused to appropriate the necessary funds which, with the grant made available by the Federal Government, were to be used to finance the proposed works. At the time of writing this report it is the understanding of this Division that reconsideration is to be given by the town to the construction of these works by presenting the matter again to the voters at the annual town meeting. It should be again emphasized that substantial modern works for the treatment of sewage from Framingham should be provided if violation of the law is to be prevented.

Franklin

The sewage of the town of Franklin is disposed of at two sewage treatment areas, most of the sewage being diverted to what is known as the Mine Brook filter beds near Unionville. Examinations made by this Division during the past year have shown that at the old Franklin sewage disposal plant, which is on Timnah Brook, considerable sewage has overflowed into the brook, but at the Mine Brook area no sewage was found to be overflowing. It is advisable that the old Franklin sewage disposal plant be abandoned and the Mine Brook area be enlarged to take care of the sewage of the town at one area. The results of the analyses show that the sewage received at the Mine Brook area was much stronger during the year 1935 than during 1934.

Gardner

Examinations did not show any considerable change in the conditions of the two sewage treatment works of the city of Gardner. The results of the analyses show that the sewage reaching these plants during the year 1935 was somewhat stronger than that during the year 1934. There was little change in the condition of the final effluent. During the latter part of the year work had been started with a view to extending the Templeton area. This area should be increased if the sewage is to be adequately treated at all times, and in addition suitable measuring devices, as recommended in the report of the Department in the year 1934 and previously, should be installed at the Templeton plant.

Hopedale

The results of the analyses of samples of the sewage and effluent at the sewage disposal works of the town of Hopedale show that there has been little change in the strength of the sewage reaching this plant and that the condition of the effluent discharged into Mill River during the year 1935 was satisfactory. These works, as during the previous years, appeared to have been efficiently operated.

Hudson

Investigations have shown that the sewage treatment plant in the town of Hudson was operated with less interruption during the past year than in 1934, and the results of the analyses show that the sewage reaching this area was similar in strength to that received during recent years. The sewage effluent discharged into the Assabet River showed less purification than in 1934. During the past year the Department called the attention of the Public Works Department of the town of Hudson to the matter of screening the sewage at the pumping station so as to prevent the overflow of raw sewage into the river. Additions to the present sewage treatment works will be necessary in the near future if overdosing of the present sewage filters is to be prevented.

Leicester

The results of the analyses show that the sewage effluent at the sewage disposal works of the town of Leicester was less satisfactory than in 1934. Plans were approved by this Department in the year 1928 for additional sewage disposal works for the town of Leicester. The works called for in these plans should be constructed if overflow of sewage into the French River from these works is to be prevented.

Leominster

During the year 1935 all of the sewage reaching the sewage treatment works of the city of Leominster was discharged without treatment into the North Branch of the Nashua River as the sewage treatment works under construction have not been completed. It is probable that portions of these works may be available for use by the late fall of 1936. According to the decree of the court handed down under date of February 25, 1933, it is necessary that removal of the sewage from the river by this municipality be completed prior to February 1, 1938. The Department, during the year, recommended the extension of a part of the sewerage system of the city of Leominster to intercept sewage from buildings located on the shores of Whalom Lake in the town of Lunenburg.

Marion

There has been little change in the amount of sewage treated and the condition of the sewage treatment works of the town of Marion during the year 1935. These works appeared to be satisfactorily operated throughout the year, and the results of the analyses show that the effluent discharged into the brook having an outlet into Buzzards Bay was satisfactory. The present plant is operated at about maximum capacity at the present time and if these works are to be operated efficiently in the future an addition to the area should be made.

Marlborough

The results of the analyses show that the sewage of the city of Marlborough was being satisfactorily treated during the year 1935, and the results of the examinations show that the sewage treatment works are efficiently operated.

Maynard

Investigations by this Department show no material changes in connection with the sewage disposal works of the town of Maynard during the year 1935. The results of the analyses show that the sewage had been reasonably well purified, and the effluent discharged was even more satisfactory than in 1934.

Milford

During the year 1935 additional sewage treatment works were under construction by the town of Milford in connection with a Federal project and in accordance with plans approved by this Department. Construction did not commence on these works until the latter part of the year, and because of the inadequacy of the present sewage disposal works it was necessary to discharge much untreated sewage into the Charles River during the year 1935.

Nantucket

After the receipt of certain petitions the Department caused an inspection to be made of the sewage disposal works of the town of Nantucket during the summer of 1935. This examination showed that the filters were badly clogged, and the Department recommended that the filters be enlarged or improved so as to prevent the escape of sewage to the surrounding lands. It is to be assumed that suitable action will be taken early during the coming year.

Natick

Near the close of the year 1934 a contract was let by the town of Natick for the construction of new sewage treatment works northwest of the present sewage treatment works, these works to consist of Imhoff tanks, trickling filters, secondary sedimentation tanks and sludge beds for the drying of sludge prior to its final disposal. The construction of this project has been completed and sewage actually was treated at the new works early in November, 1935.

North Attleborough

Further enlargements in the sewage treatment works of the town of North Attleborough are necessary as has been recommended in previous reports of this Department. During the past year one bed was reconstructed, but an additional area is necessary if the sewage is to be adequately treated at these works. The results of the analyses show a slight improvement in the quality of the effluent discharged, but an increase in the area should be provided for the disposal of sewage from this town if pollution of the Ten Mile River is to be prevented.

Northbridge

During the year 1935 the sewage at Northbridge, judging from the analyses, appeared to be adequately filtered. The results of the analyses show that the strength of the sewage during the past year was similar to that of recent years and that the quality of the effluent was slightly improved over that of 1934. It is recommended as in the 1934 report that a measuring device be installed at these works in order that more information may be available as to the quantity of sewage treated and that consideration be given at an early date to increasing the area of the filters.

Pittsfield

During the year 1935 the city of Pittsfield engaged the services of a consulting engineer with a view to preparing plans for the construction of additional sewage treatment works. These plans which were presented to the Department and approved under date of October 15, 1935, provide for pumping the sewage at the present sewage pumping station to trickling filters to be located at the site of the present intermittent sand filters. The contract was awarded in December, 1935. The results of the analyses show that the sewage treated by the city of Pittsfield during the year 1935 was somewhat stronger than in 1934, and much untreated sewage was allowed to overflow into the Housatonic River.

Southbridge

During the year 1935 the town of Southbridge completed the reconstruction of five of its sewage filters, and these beds were placed in use before the end of the year. In spite of these changes large quantities of untreated sewage were discharged into the Quinebaug River. The results of the analyses show that the sewage treated was somewhat stronger than in 1934. Provisions for more adequate sewage disposal works should be made by this town at the earliest practicable date.

Spencer

During the summer of 1935 the new sewage treatment works of the town of Spencer were placed in use, thus providing three acres in addition to the old sewage treatment works of this town. During the year 1935 less sewage overflowed into the Seven Mile River than has been the case during recent years. To prevent the overflow of sewage at all times it will be necessary to carry out the recommendations of the Department in the matter of the separation of the storm water from the sanitary sewage.

Stockbridge

It is necessary that additions be made to the sewage disposal works of the town of Stockbridge at the earliest practicable date in order to prevent pollution of the Housatonic River.

Westborough

The sewage disposal works at Westborough were operated in a reasonably satisfactory manner during the year 1935, and the results of the analyses show that a good quality of effluent was discharged from these works into the Assabet River.

Winchendon

The Winchendon sewage disposal works appeared to be well operated during 1935, and the results of the analyses of the effluent discharged showed an improvement over that of 1934. It was recommended in the report of the Department for the year 1934 that a measuring device be installed for determining the amount of sewage treated at these works to assist in the proper operation of the plant at all times.

Worcester

The sewage treatment works of the city of Worcester during the year 1935, as in previous years, have been under expert supervision, and the analyses show that the sewage from this city is reasonably well purified. During the year 1935 a Federal unemployment relief project was conducted in the matter of investigating the pollution of the Blackstone River, and as a part of this work a chemist was employed in the laboratories of the Worcester sewage treatment works. His work has been chiefly research in character with a view to designing additional works for the treatment of industrial wastes.

Certain sewerage statistics and the results of the analyses and records of operation of the major municipal sewage treatment works in this State are given in the following tables.

Sewerage and Sewage Disposal in Massachusetts, 1935

City or Town	Population 1935	Means of Disposal	Sewage or Effluent Discharged into
Abington	5,696	None	– –
Acton	2,635	None	– –
Acushnet	3,951	None	– –
Adams	12,858	Dilution	Hoosick River
Agawam	7,206	None	– –
Alford	210	None	– –
Amesbury	10,514	Dilution	Merrimack River
Amherst	6,473	Dilution Sedimentation tanks, sand filters	Connecticut River Fort River
Andover	10,542	Dilution	Merrimack River
Arlington	38,539	North Metropolitan District	Boston Harbor
Ashburnham	2,051	None	– –
Ashby	957	None	– –
Ashfield	918	None	– –
Ashland	2,497	None	– –
Athol	10,751	Dilution	Millers River
ATTLEBORO	21,835	Sand filters	Ten Mile River
Auburn	6,535	None	– –
Avon	2,362	None	– –
Ayer	3,861	None	– –
Barnstable	8,037	None	– –
Barre	3,509	None	– –
Becket	723	None	– –
Bedford	3,185	None	– –
Belchertown	3,863	None	– –
Bellingham	3,056	None	– –
Belmont	24,831	North Metropolitan District	Boston Harbor
Berkley	1,156	None	– –
Berlin	1,091	None	– –
Bernardston	975	None	– –
BEVERLY	25,871	South Essex Sewerage District	Salem Harbor
Billerica	6,650	Sand Filters	Concord River
Blackstone	4,588	None	– –
Blandford	469	None	– –
Bolton	739	None	– –
BOSTON	817,713	Boston Main Drainage North Metropolitan and South Metropolitan Districts	Boston Harbor
Bourne	3,336	None	– –
Boxborough	404	None	– –
Boxford	726	None	– –
Boylston	1,361	None	– –
Braintree	17,122	South Metropolitan District	Boston Harbor
Brewster	715	None	– –
Bridgewater	9,201	Dilution	Town River
Brimfield	892	None	– –
BROCKTON	62,407	Sedimentation, trickling, secondary sedimentation and sand filters	Cowesset River
Brookfield	1,309	None	– –
Brookline	50,319	South Metropolitan District	Boston Harbor
Buckland	1,540	None	– –
Burlington	2,146	None	– –

Sewerage and Sewage Disposal in Massachusetts, 1935—Continued

City or Town	Population 1935	Means of Disposal	Sewage or Effluent Discharged into
CAMBRIDGE	118,075	North Metropolitan District	Boston Harbor
Canton	6,505	South Metropolitan District	Boston Harbor
Carlisle	688	None	Boston Harbor
Carver	1,559	None	– –
Charlemont	923	None	– –
Charlton	2,366	None	– –
Chatham	2,050	None	– –
Chelmsford	7,595	Dilution	Stony Brook—Merrimack River
CHELSEA	42,673	North Metropolitan District	Boston Harbor
Cheshire	1,660	None	– –
Chester	1,362	None	– –
Chesterfield	445	None	– –
CHICOPEE	41,952	Dilution	Chicopee and Connecticut Rivers
Chilmark	253	None	– –
Clarksburg	1,333	None	– –
Clinton	12,373	Sedimentation basins, sand filters	Nashua River
Cohasset	3,418	None	– –
Colrain	1,554	None	– –
Concord	7,723	Sand filters	Concord River
Conway	952	None	– –
Cummington	610	None	– –
Dalton	4,282	Dilution	Housatonic River
Dana	387	None	– –
Danvers	13,884	(a)None	– –
Dartmouth	9,424	None	– –
Dedham	15,371	South Metropolitan District	Boston Harbor
Deerfield	2,963	*Dilution	Deerfield River and Connecticut River
Dennis	2,017	None	– –
Dighton	3,116	None	– –
Douglas	2,403	None	– –
Dover	1,305	None	– –
Dracut	6,500	(b)None	– –
Dudley	4,568	None	– –
Dunstable	419	None	– –
Duxbury	2,244	None	– –
East Bridgewater	3,670	None	– –
East Brookfield	945	None	– –
East Longmeadow	3,375	None	– –
Eastham	606	None	– –
Easthampton	10,486	Sedimentation Tanks, sand filters	Manhan River
Easton	5,294	None	– –
Edgartown	1,399	None	– –
Egremont	569	None	– –
Enfield	495	None	– –
Erving	1,283	None	– –
Essex	1,486	None	– –
EVERETT	47,228	North Metropolitan District	Boston Harbor
Fairhaven	11,005	Dilution	Acushnet River
FALL RIVER	117,414	Dilution	Taunton River
Falmouth	6,537	None	– –
FITCHBURG	41,700	Imhoff tanks, trickling filter, secondary tanks	Nashua River
Florida	405	None	– –
Foxborough	5,834	Sand filtration	Rumford River
Framingham	22,651	Imhoff tanks, sand filters	Bannister Brook
Franklin	7,494	Sedimentation tanks, sand filters (two disposal plants)	Mine and Timmoth Brooks
Freetown	1,813	None	– –
GARDNER	20,397	Sedimentation tanks, sand filters (two disposal plants)	Otter River
Gay Head	158	None	– –
Georgetown	2,009	None	– –
Gill	995	None	– –
GLOUCESTER	24,164	Dilution	Gloucester Harbor
Goshen	257	None	– –
Gosnold	129	None	– –
Grafton	7,681	None	– –
Granby	956	None	– –
Granville	704	None	– –
Great Barrington	6,369	Dilution	Housatonic River
Greenfield	15,903	Dilution	Green River
Greenwich	219	None	– –
Groton	2,534	None	– –
Groveland	2,219	None	– –
Hadley	2,711	None	– –
Halifax	817	None	– –
Hamilton	2,235	None	– –
Hampden	854	None	– –

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* Under construction.
(a) Member of South Essex Sewerage District but has no service connections.
(b) Certain local sewers with disposal works on mill property.

Sewerage and Sewage Disposal in Massachusetts, 1935—Continued

City or Town	Population 1935	Means of Disposal	Sewage or Effluent Discharged into
Hancock	408	None	– –
Hanover	2,709	None	– –
Hanson	2,417	None	– –
Hardwick	2,379	Dilution	Ware River
Harvard	952	None	– –
Harwich	2,373	None	– –
Hatfield	2,433	Dilution	Mill River
HAVERHILL	49,516	Dilution	Merrimack River
Hawley	308	None	– –
Heath	368	None	– –
Hingham	7,330	None	– –
Hinsdale	1,144	Dilution	Housatonic River
Holbrook	3,364	None	– –
Holden	3,914	None	– –
Holland	201	None	– –
Holliston	2,925	None	– –
HOLYOKE	56,139	Dilution	Connecticut River
Hopedale	3,068	Septic tanks, sand filters	Mill River
Hopkinton	2,616	None	– –
Hubbardston	1,000	None	– –
Hudson	8,495	Sedimentation tanks, sand filters	Assabet River
Hull	2,619	Dilution	Nantasket Roads and Weir River
Huntington	1,345	Dilution	Westfield River
Ipswich	6,217	None	– –
Kingston	2,743	None	– –
Lakeville	1,443	None	– –
Lancaster	2,590	None	– –
Lanesborough	1,237	None	– –
LAWRENCE	86,785	Dilution	Merrimack River
Lee	4,178	Dilution	Housatonic River
Leicester	4,426	Sedimentation tank, sand filters	Town Meadow Brook
Lenox	2,706	Sedimentation tanks, sand filters	Housatonic River
LEOMINSTER	21,894	*Grit chamber, preliminary sedimentation, activated sludge, secondary sedimentation, sludge storage	Nashua River
Leverett	726	None	– –
Lexington	10,813	North Metropolitan District	Boston Harbor
Leyden	253	None	– –
Lincoln	1,573	None	– –
Littleton	1,530	None	– –
Longmeadow	5,105	Dilution	Connecticut River
LOWELL	100,114	Dilution	Merrimack River
Ludlow	8,569	Dilution	Chicopee River
Lunenburg	2,124	None	– –
LYNN	100,909	Sea outfall	Lynn Harbor
Lynnfield	1,896	None	– –
MALDEN	57,277	North Metropolitan District	Boston Harbor
Manchester	2,509	Sea outfall	Atlantic Ocean
Mansfield	6,543	None	– –
Marblehead	10,173	Sea outfall	Atlantic Ocean
Marion	1,867	Sedimentation tanks, sand filters	Buzzards Bay
MARLBOROUGH	15,781	Sedimentation tanks, sand filters	Hop Brook
Marshfield	2,073	None	– –
Mashpee	380	None	– –
Mattapoisett	1,682	None	– –
Maynard	7,107	Imhoff tank, trickling filter, secondary sedimentation	Assabet River
Medfield	4,162	Sand filters	Charles River
MEDFORD	61,444	North Metropolitan District	Boston Harbor
Medway	3,268	None	– –
MELROSE	24,256	North Metropolitan District	Boston Harbor
Mendon	1,265	None	– –
Merrimac	2,209	None	– –
Methuen	21,073	Dilution	Spicket and Merrimack Rivers
Middleborough	8,865	Dilution	Nemasket River
Middlefield	220	None	– –
Middleton	1,975	None	– –
Milford	15,008	Sedimentation and Imhoff tanks, sand and trickling filters	Charles River
Millbury	6,879	None	– –
Millis	2,098	Sedimentation tanks and sand filters	Charles River
Millville	1,901	None	– –
Milton	18,147	South Metropolitan District	Boston Harbor
Monroe	240	None	– –
Monson	5,193	None	– –
Montague	7,967	Dilution	Connecticut River
Monterey	325	None	– –
Montgomery	174	None	– –
Mt. Washington	64	None	– –
Nahant	1,748	Outfall sewers	Atlantic Ocean
Nantucket	3,495	Sand filters (two disposal works)	– –

* Under Construction.

Sewerage and Sewage Disposal in Massachusetts, 1935—Continued

City or Town	Population 1935	Means of Disposal	Sewage or Effluent Discharged into
Natick	14,394	Imhoff tank, trickling filter, secondary sedimentation	Subury River
Needham	11,828	South Metropolitan District	Boston Harbor
New Ashford	94	None	– –
NEW BEDFORD	110,022	Outfall sewer	Buzzards Bay
New Braintree	436	None	– –
New Marlborough	921	None	– –
New Salem	443	None	– –
Newbury	1,576	None	– –
NEWBURYPORT	14,815	Dilution	Merrimack River
NEWTON	66,144	South Metropolitan District	Boston Harbor
Norfolk	2,073	None	– –
NORTH ADAMS	22,085	Sedimentation tanks, sludge digestion	Hoosick River
North Andover	7,164	Dilution	Merrimack River
North Attleborough	10,202	Sedimentation tanks, sand filters	Ten Mile River
North Brookfield	3,186	Irrigation	Moore Brook
North Reading	2,321	None	– –
NORTHAMPTON	24,525	Dilution	Mill River
Northborough	2,396	None	– –
Northbridge	10,577	Sedimentation tanks, sand filters	Blackstone River
Northfield	1,950	None	– –
Norton	2,925	None	– –
Norwell	1,666	None	– –
Norwood	15,574	South Metropolitan District	Boston Harbor
Oak Bluffs	1,657	None	– –
Oakham	441	None	– –
Orange	5,383	Dilution	Millers River
Orleans	1,425	None	– –
Otis	415	None	– –
Oxford	4,249	None	– –
Palmer	9,437	Dilution	Quaboag River
Paxton	731	None	– –
PEABODY	22,082	South Essex Sewerage District	Salem Harbor
Pelham	504	None	– –
Pembroke	1,621	None	– –
Pepperell	3,004	None	– –
Peru	151	None	– –
Petersham	718	None	– –
Phillipston	423	None	– –
PITTSFIELD	47,516	Sedimentation tank, sand filters	Housatonic River
Plainfield	332	None	– –
Plainville	1,606	None	– –
Plymouth	13,183	Dilution	Plymouth Harbor
Plympton	558	None	– –
Prescott	18	None	– –
Princeton	707	None	– –
Provincetown	4,071	None	– –
QUINCY	76,909	South Metropolitan District	Boston Harbor
Randolph	7,580	None	– –
Raynham	2,208	None	– –
Reading	10,703	North Metropolitan District	Boston Harbor
Rehoboth	2,777	None	– –
REVERE	35,319	North Metropolitan District	Boston Harbor
Richmond	628	None	– –
Rochester	1,229	None	– –
Rockland	7,890	None	– –
Rockport	3,634	None	– –
Rowe	277	None	– –
Rowley	1,495	None	– –
Royalston	841	None	– –
Russell	1,283	None	– –
Rutland	2.406	None	– –
SALEM	43,472	South Essex Sewerage District	Salem Harbor
Salisbury	2,245	Outfall sewer	Black Rock Creek
Sandisfield	471	None	– –
Sandwich	1,516	None	– –
Saugus	15,076	None	– –
Savoy	299	None	– –
Scituate	3,846	None	– –
Seekonk	5,011	None	– –
Sharon	3,683	None	– –
Sheffield	1,810	None	– –
Shelburne	1,606	None	– –
Sherborn	994	None	– –
Shirley	2,548	None	– –
Shrewsbury	7,144	None	– –
Shutesbury	239	None	– –
Somerset	5,656	None	– –
SOMERVILLE	100,773	North Metropolitan District	Boston Harbor
South Hadley	6,838	Dilution	Connecticut River
Southampton	954	None	– –
Southborough	2,109	None	– –
Southbridge	15,786	Sedimentation tanks, sand filters	Quinebaug River
Southwick	1,540	None	– –

Sewerage and Sewage Disposal in Massachusetts, 1935—Concluded

City or Town	Population 1935	Means of Disposal	Sewage or Effluent Discharged into
Spencer	6,487	Sand filters	Seven Mile River
SPRINGFIELD	149,642	Dilution	Connecticut River
Sterling	1,556	None	– –
Stockbridge	1,921	Sand filters	Housatonic River
Stoneham	10,841	North Metropolitan District	Boston Harbor
Stoughton	8,478	*South Metropolitan District	Boston Harbor
Stow	1,190	None	– –
Sturbridge	1,918	None	– –
Sudbury	1,638	None	– –
Sunderland	1,182	None	– –
Sutton	2,408	None	– –
Swampscott	10,480	Sea outfall	Atlantic Ocean
Swansea	4,327	None	– –
TAUNTON	37,431	Dilution	Taunton River
Templeton	4,302	None	– –
Tewksbury	6,563	None	– –
Tisbury	1,822	None	– –
Tolland	141	None	– –
Topsfield	1,113	None	– –
Townsend	1,942	None	– –
Truro	541	None	– –
Tyngsborough	1,331	None	– –
Tyringham	243	None	– –
Upton	2,163	None	– –
Uxbridge	6,397	None	– –
Wakefield	16,494	North Metropolitan District	Boston Harbor
Wales	382	None	– –
Walpole	7,449	South Metropolitan District	Boston Harbor
WALTHAM	40,557	South Metropolitan District	Boston Harbor
Ware	7,727	Dilution	Ware River
Wareham	6,047	None	– –
Warren	3,662	None	– –
Warwick	565	None	– –
Washington	252	None	– –
Watertown	35,827	South Metropolitan District	Boston Harbor
Wayland	3,346	None	– –
Webster	13,837	Dilution	French River
Wellesley	13,376	South Metropolitan District	Boston Harbor
Wellfleet	947	None	– –
Wendell	397	None	– –
Wenham	1,196	None	– –
West Boylston	2,158	None	– –
West Bridgewater	3,356	None	– –
West Brookfield	1,258	None	– –
West Newbury	1,475	None	– –
West Springfield	17,118	Dilution	Westfield River
West Stockbridge	1,138	None	– –
West Tisbury	282	None	– –
Westborough	6,073	Sand filters	Assabet River
WESTFIELD	18,788	Dilution	Westfield River
Westford	3,789	None	– –
Westhampton	405	None	– –
Westminster	1,965	None	– –
Weston	3,848	None	– –
Westport	4,355	None	– –
Westwood	2,537	None	– –
Weymouth	21,748	(c)None	– –
Whately	1,133	None	– –
Whitman	7,591	None	– –
Wilbraham	2,969	None	– –
Williamsburg	1,859	None	– –
Williamstown	4,272	Dilution	Hoosick River
Wilmington	4,493	None	– –
Winchendon	6,603	Sedimentation tanks, sand filters	Millers River
Winchester	13,371	North Metropolitan District	Boston Harbor
Windsor	412	None	– –
Winthrop	17,001	North Metropolitan District	Boston Harbor
WOBURN	19,695	North Metropolitan District	Boston Harbor
WORCESTER	190,471	Imhoff tanks, trickling filter, secondary sedimentation	Blackstone River
Worthington	530	None	– –
Wrentham	4,160	None	– –
Yarmouth	2,095	None	– –

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* Under Construction.

(c) Member of South Metropolitan Sewerage District but has no service connections.

TABLE No. 1.—*Average Results of the Analyses of Samples of Sewage as Received at Disposal Works*

(Parts per Million)

CITY OR TOWN	RESIDUE ON EVAPORATION						AMMONIA				Chlorides	Oxygen Consumed	IRON		Kjeldahl Nitrogen	Fats	Alkalinity
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID									
	Total	Dis-solved	Sus-pended	Total	Dis-solved	Sus-pended	Free	Total	Dis-solved	Sus-pended			Total	Dis-solved			
ATTLEBORO . . .	361	237	124	185	75	110	40.8	7.52	4.09	3.43	37	63.5	1.73	.58	16.8	–	174
BROCKTON . . .	695	511	184	370	204	166	61.3	9.98	6.16	3.82	90	140.3	1.21	.59	20.7	89	236
Clinton	716	490	226	450	275	175	30.1	8.82	6.29	2.53	45	78.7	1.63	47	18.8	102	140
Concord	243	199	44	120	93	27	17.5	2.65	1.71	.94	21	28.1	.47	.19	6.2	–	74
Easthampton . . .	497	318	179	285	139	146	57.0	10.96	7.23	3.73	43	89.5	1.02	.31	22.3	–	216
FITCHBURG . . .	302	257	45	149	115	34	23.1	3.26	2.45	81	28	40.9	1.96	1.17	7.1	27	101
Framingham[1] . . .	577	401	176	306	167	139	35.8	7.14	4.48	2.66	43	62.5	1.77	.57	13.8	64	173
Framingham[2] . . .	711	455	256	418	218	200	36.9	8.90	5.86	3.04	46	111.3	2.13	.51	20.4	88	176
Franklin	1,240	1,078	162	317	195	122	43.7	12.56	8.16	4.40	344	104.7	1.65	.66	21.7	–	193
GARDNER (Gardner Area) .	749	470	279	506	257	249	69.7	15.03	9.47	5.56	56	125.8	1.58	.45	33.3	132.	259
GARDNER (Templeton Area)	612	384	228	375	173	202	66.8	11.19	7.35	3.84	51	100.7	1.66	.51	23.3	95	240
Hopedale . . .	810	505	305	516	256	260	55.3	10.73	8.17	2.56	44	117.0	4.95	1.89	26.9	–	221
Hudson	629	420	209	371	191	180	68.4	11.13	7.73	3.40	54	98.3	1.20	.43	21.8	102	237
Leicester	251	206	45	127	90	37	34.8	5.36	3.92	1.44	26	45.0	.59	.19	12.6	–	130
Marion	305	222	83	154	80	74	19.4	3.42	2.21	1.21	36	37.1	.83	.36	7.0	–	84
MARLBOROUGH . .	511	342	169	299	141	158	38.3	9.80	6.34	3.46	55	83.7	1.28	.45	15.6	97	161
Maynard . . .	989	522	467	655	263	392	87.9	28.79	16.58	12.21	64	148.6	2.38	.68	35.1	–	300
Milford	416	291	125	213	103	110	38.1	4.54	3.26	1.28	41	53.7	.78	.26	10.9	–	163
Natick	629	412	217	365	179	186	43.4	8.06	4.60	3.46	43	71.0	1.18	.30	18.4	87	177
North Attleborough . .	291	223	68	137	79	58	16.4	3.70	2.15	1.55	20	34.1	.54	.29	7.3	–	86
Northbridge . . .	473	286	187	304	145	159	41.9	9.48	6.54	2.94	32	71.6	1.22	.41	18.2	–	149
PITTSFIELD . . .	429	314	115	231	140	91	38.3	7.33	4.58	2.75	31	62.4	2.80	.29	15.2	55	205
Southbridge . . .	643	374	269	393	186	207	34.0	8.24	4.94	3.30	41	81.8	1.31	.43	18.7	109	141
Spencer	294	227	67	159	102	57	34.2	6.60	4.57	2.03	31	59.6	1.17	.44	13.7	52	124
Stockbridge . . .	365	286	79	204	152	52	14.1	3.24	2.24	1.00	13	36.3	.52	.24	6.6	–	140
Westborough . . .	438	281	157	269	141	128	46.7	9.16	6.09	3.06	32	72.5	1.12	.36	17.9	66	169
Winchendon . . .	243	209	34	102	73	29	25.9	6.74	3.66	3.08	38	57.0	2.85	1.13	17.7	–	169
WORCESTER . . .	955	595	360	388	128	260	24.1	6.93	1.69	5.24	89	83.8	53.50	11.03	16.1	86	59

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[1] Entrance to Imhoff tanks.

[2] At Pumping Station.

TABLE NO. 2.—*Average Results of the Analyses of Samples of Sewage as Applied to Filter Beds After Preliminary Treatment as Indicated*

(Parts per Million)

CITY OR TOWN	Form of Preliminary Treatment	RESIDUE ON EVAPORATION						AMMONIA				Chlorides	Oxygen Consumed	IRON		Kjeldahl Nitrogen	Fats	Alkalinity
		TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID									
		Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended			Total	Dissolved			
ATTLEBORO	None	361	237	124	185	75	110	40.8	7.52	4.09	3.43	37	63.5	1.73	.58	16.8	–	174
BROCKTON	Sedim'n Tanks	626	525	101	283	187	96	60.3	7.48	5.59	1.89	107	123.3	1.32	.53	16.7	58	228
Clinton	Sedim'n Basins	493	461	32	279	254	25	22.5	5.48	4.03	1.45	39	31.4	1.33	.60	9.4	27	109
Concord	None	243	199	44	120	93	27	17.5	2.65	1.71	.94	21	28.1	.47	.19	6.2	–	74
Easthampton	Sedim'n Tanks	360	279	81	163	107	56	58.9	5.48	3.54	1.94	38	56.7	.67	.31	13.9	–	212
FITCHBURG	Imhoff Tanks	294	256	38	143	117	26	23.4	3.12	2.26	.86	28	42.8	1.99	1.07	7.4	26	99
Framingham	Imhoff Tanks	519	457	62	200	149	51	41.0	7.85	6.12	1.73	46	49.1	1.18	.65	12.9	30	192
Franklin	Sedim'n Tanks	975	913	62	245	189	56	35.8	4.82	3.04	1.78	230	62.3	.95	.55	10.4	–	141
GARDNER (Gardner Area)	None	749	470	279	506	257	249	69.7	15.03	9.47	5.56	56	125.8	1.58	.45	33.3	132	259
GARDNER (Templeton Area)	Sedim'n Tanks	420	347	73	192	148	44	48.4	5.52	3.60	1.92	43	55.3	1.09	.54	12.8	44	185
Hopedale	Septic Tanks	280	249	31	145	116	29	36.5	3.66	2.29	1.37	34	43.5	1.03	.67	7.5	–	142
Hudson	Sedim'n Tanks	472	368	104	222	164	58	57.3	5.94	3.54	2.40	52	61.7	.93	.50	13.3	65	214
Leicester	None	251	206	45	127	90	37	34.8	5.36	3.92	1.44	26	45	.59	.19	12.6	–	130
Marion	Sedim'n Tanks	227	203	24	110	87	23	21.0	3.05	2.22	.83	30	25.3	.71	.42	5.5	–	85
MARLBOROUGH	Sedim'n Tanks	403	349	54	201	155	46	42.2	5.58	4.33	1.25	45	53.9	1.16	.50	11.8	52	182
Maynard	Imhoff Tank	407	343	64	189	134	55	56.9	6.06	4.19	1.87	57	58.5	1.37	.60	12.9	–	195
Milford	Sedim'n Tanks	599	505	94	292	236	56	45.7	6.10	4.28	1.82	91	84.7	1.01	.45	13.2	–	199
Milford	Imhoff Tank	422	388	34	172	149	23	34.5	3.64	2.70	.94	52	44.8	.56	.27	7.0	–	152
Natick	None	629	412	217	365	179	186	43.4	8.06	4.60	3.46	43	71.0	1.18	.30	18.4	87	177
North Attleborough	Sedim'n Tanks	235	205	30	100	75	25	15.9	2.27	1.61	.66	18	27.4	.53	.27	6.0	–	91
Northbridge	Sedim'n Tanks	274	226	48	148	103	45	30.8	4.62	2.97	1.65	25	32.6	.67	.32	8.9	–	99
PITTSFIELD	Sedim'n Tank	355	298	57	178	135	43	30.1	4.70	3.33	1.37	28	48.8	1.12	.35	10.1	38	185
Southbridge	Sedim'n Tanks	468	375	93	271	181	90	48.7	8.00	5.36	2.64	44	69.3	1.01	.53	16.8	73	186
Spencer	None	294	227	67	159	102	57	34.2	6.60	4.57	2.03	31	59.6	1.17	.44	13.7	52	124
Stockbridge	None	365	286	79	204	152	52	14.1	3.24	2.24	1.00	13	36.3	.52	.24	6.6	–	140
Westborough	None	438	281	157	269	141	128	46.7	9.16	6.09	3.06	32	72.5	1.12	.36	17.9	66	169
Winchendon	Sedim'n Tanks	219	208	11	80	74	6	25.6	2.12	1.51	.61	31	29.4	1.67	1.15	6.2	–	116
WORCESTER	Imhoff Tanks	658	463	195	247	125	122	29.9	3.58	1.76	1.82	84	64.0	14.15	3.09	9.1	44	142

TABLE NO. 3.—*Efficiency of Settling Tanks and Other Forms of Preliminary Treatment as Indicated by the Foregoing Tables*

(Parts per Million)

City or Town	Form of Preliminary Treatment	Detention Period (Hours)	Suspended Solids			Total Albuminoid Ammonia			Oxygen Consumed			Fats			Chlorides	
			Raw Sewerage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage	Per Cent Removed	Raw Sewage	Settled or treated Sewage
Brockton	Sedimentation Tanks	2.6	184	101	45	9.98	7.48	25	140.3	123.3	12	89	58	35	90	107
Clinton	Sedimentation Basins	7.4	226	32	86	8.82	5.48	38	78.7	31.4	60	102	27	74	45	39
Easthampton	Sedimentation Tanks	–	179	81	55	10.96	5.48	50	89.5	56.7	37	–	–	–	43	38
Fitchburg	Imhoff Tanks	7.2	45	38	16	3.26	3.12	4	40.9	42.8	–	27	26	4	28	28
Framingham	Imhoff Tanks	1.7	176	62	65	7.14	7.85	–	62.5	49.1	21	64	30	53	43	46
Franklin	Sedimentation Tanks	8.9	162	62	62	12.56	4.82	62	104.7	62.3	40	–	–	–	344	230
Gardner (Templeton Area)	Sedimentation Tanks	–	228	73	68	11.19	5.52	51	100.7	55.3	45	95	44	54	51	43
Hopedale	Septic Tanks	12.4	305	31	90	10.73	3.66	66	117.0	43.5	63	–	–	–	44	34
Hudson	Sedimentation Tanks	12.2	209	104	50	11.13	5.94	47	98.3	61.7	37	102	65	36	54	52
Marion	Sedimentation Tanks	20.0	83	24	71	3.42	3.05	11	37.1	25.3	32	–	–	–	36	30
Marlborough	Sedimentation Tanks	8.5	169	54	68	9.80	5.58	43	83.7	53.9	36	97	52	46	55	45
Maynard	Imhoff Tank	12.5	467	64	86	28.79	6.06	79	148.6	58.5	61	–	–	–	64	57
Milford	Sedimentation Tanks	13.2	125	94	25	4.54	6.10	–	53.7	84.7	–	–	–	–	41	91
Milford	Imhoff Tank	–	125	34	73	4.54	3.64	20	53.7	44.8	17	–	–	–	41	52
North Attleborough	Sedimentation Tanks	2.9	68	30	56	3.70	2.27	39	34.1	27.4	20	–	–	–	20	18
Northbridge	Sedimentation Tanks	2.3	187	48	74	9.48	4.62	51	71.6	32.6	54	–	–	–	32	25
Pittsfield	Sedimentation Tank	3.9	115	57	50	7.33	4.70	36	62.4	48.8	22	55	38	31	31	28
Southbridge	Sedimentation Tanks	10.8	269	93	65	8.24	8.00	3	81.8	69.3	15	109	73	33	41	44
Winchendon	Sedimentation Tanks	–	34	11	68	6.74	2.12	69	57.0	29.4	48	–	–	–	38	31
Worcester	Imhoff Tanks	3.0	360	195	46	6.93	3.58	48	83.8	64.0	24	86	44	49	89	84

TABLE No. 4.—*Average Results of the Analyses of Samples of Sewage Applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester and Their Effluents, etc., Per Cent Removed, etc.*

(Parts per Million)

Brockton

	RESIDUE ON EVAPORATION						AMMONIA				Chlorides	NITROGEN AS —		Oxygen Consumed	Kjeldahl Nitrogen	Fats	REMARKS
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID									
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended		Nitrates	Nitrites				
Settled sewage as applied to trickling filter.	626.	525.	101.	283.	187.	96.	60.3	7.48	5.59	1.89	107.	–	–	123.3	16.7	58.	Trickling filter has an area of 2.0 acres and a depth of 10 feet of stone from 1.5 to 3 inches in size.
Effluent from trickling filter.	505.	457.	48.	171.	129.	42.	36.5	4.33	1.94	2.39	101.	17.13	.46	59.9	8.4	25.	One half of filter used alternately. The average rate of operation was about 1,444,000 gallons per acre per day.
Per cent removed.	19	13	52	40	31	56	39	42	65	–	6	–	–	51	50	57	
Settled effluent from trickling filter.	481.	451.	30.	154.	129.	25.	34.3	2.67	1.86	.81	99.	14.63	.53	45.8	6.4	14.	
Per cent removed by secondary settling tank.	5	1	38	10	0	40	6	38	4	66	2	15	–	24	24	44	Period of sedimentation averaged about 1.7 hours.
Per cent removed by trickling filter and secondary settling tank.	23	14	70	46	31	74	43	64	67	57	7	–	–	63	62	76	Tanks cleaned 52 times.

Fitchburg

Imhoff tank effluent as applied to trickling filter.	294.	256.	38.	143.	117.	26.	23.4	3.12	2.26	.86	28.	–	–	42.8	7.4	26.	Trickling filter has an area of 2.14 acres and a depth of 10 feet of stone from 1 to 3 inches in size.
Effluent from trickling filter.	304.	247.	57.	147.	107.	40.	5.2	2.11	.97	1.14	29.	13.46	.53	26.5	4.9	–	The average rate of operation was about 1,650,000 gallons per acre per day for area used (1.86 acres).
Per cent removed.	–	4	–	–	9	–	78	32	57	–	–	–	–	38	34	–	
Settled effluent from trickling filter as discharged to Nashua River.	259.	240.	19.	117.	108.	9.	5.5	1.57	.90	.67	28.	14.66	.54	21.8	3.3	–	
Per cent removed by secondary settling tanks.	15	3	67	20	–	78	–	26	1	41	3	–	–	18	33	–	Period of sedimentation about 1 hour.
Per cent removed by trickling filter and secondary settling tanks.	12	6	50	18	8	65	76	50	60	22	0	–	–	49	55	–	Tanks cleaned 5 times.

Maynard

Imhoff tank effluent as applied to trickling filter.	407.	343.	64.	189.	134.	55.	56.9	6.06	4.19	1.87	57.	–	–	58.5	12.9	–	Trickling filter has an area of .25 of an acre and a depth of 7 feet of stone from 1½ to 2½ inches in size.
Effluent from trickling filter.	392.	350.	42.	164.	125.	39.	25.6	2.79	1.73	1.06	58.	21.31	.31	27.1	6.7	–	The average rate of operation was about 352,000 gallons per acre per day.
Per cent removed.	4	–	34	13	7	29	55	54	59	43	–	–	–	54	48	–	
Settled effluent from trickling filter as discharged to Assabet River.	438.	418.	20.	182.	166.	16.	27.9	2.62	1.92	.70	62.	24.00	.48	27.1	5.2	–	
Per cent removed by secondary settling tank.	–	–	52	–	–	59	–	–	–	34	–	–	–	0	22	–	Period of sedimentation about 8.5 hours.
Per cent removed by trickling filter and secondary settling tank.	–	–	69	4	–	71	51	57	54	63	–	–	–	54	60	–	Tanks cleaned 20 times.

TABLE NO. 4.—*Average Results of the Analyses of Samples of Sewage Applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester and Their Effluents, etc., Per Cent Removed, etc.*—Concluded

(Parts per Million)

Milford

	RESIDUE ON EVAPORATION						AMMONIA					NITROGEN AS—					
	TOTAL RESIDUE			LOSS ON IGNITION				ALBUMINOID									
	Total	Dissolved	Suspended	Total	Dissolved	Suspended	Free	Total	Dissolved	Suspended	Chlorides	Nitrates	Nitrites	Oxygen Consumed	Kjeldahl Nitrogen	Fats	REMARKS
Imhoff tank effluent as applied to trickling filter.	422.	388.	34.	172.	149.	23.	34.5	3.64	2.70	.94	52.	2.89	.19	44.8	7.0	–	Trickling filter has an area of .28 of an acre and a depth of 6 feet of stone from 1 to 1¾ inches in size.
Effluent from trickling filter.	431.	405.	26.	132.	112.	20.	17.1	1.68	.99	.69	69.	13.56	.20	25.1	3.4	–	
Per cent removed.	–	–	24.	23.	25.	13.	50.	54.	63.	–	–	–	–	44.	51.	–	
Settled effluent from trickling filter as discharged to Charles River.	437.	411.	26.	130.	110.	20.	14.0	1.54	1.03	.51	70.	12.56	.22	23.0	3.4	–	
Per cent removed by secondary settling tank.	–	–	–	2.	2.	0.	18.	8.	–	26.	–	7.	–	8.	0.	–	
Per cent removed by trickling filter and secondary settling tank.	–	–	24.	24.	26.	13.	59.	58.	62.	46.	–	–	–	49.	51.	–	

Worcester

Imhoff tank effluent as applied to trickling filters.	658.	463.	195.	247.	125.	122.	29.9	3.58	1.76	1.82	84.	–	–	64.0	9.2	44.	Trickling filters have an area of 13.68 acres and a depth of 10 feet of stone from 1¼ to 3 inches in size.
Effluent from trickling filters.	580.	434.	146.	188.	109.	79.	11.8	2.14	.60	1.54	75.	8.90	.45	34.1	5.0	17.	The average rate of operation was about 1,437,000 gallons per acre per day.
Per cent removed.	12	6	25	24	13	35	61	40	66	15	11	–	–	47	46	61	
Settled effluent from trickling filters as discharged to Blackstone River.	464.	416.	48.	139.	108.	31.	11.9	.82	.43	.39	78.	9.28	.40	24.7	3.0	21.	
Per cent removed by secondary settling tanks.	20	4	67	26	1	61	–	.62	28	75	–	–	11	27	40	–	Period of sedimentation averaged about 2.3 hours.
Per cent removed by trickling filters and secondary settling tanks.	29	10	75	44	14	75	60	77	76	79	7	–	–	61	67	52	

TABLE NO. 5.—*Average Results of Analyses of Samples of Effluent from Sand Filters*

(Parts per Million)

	Free Ammonia	Total Albuminoid Ammonia	Kjeldahl Nitrogen	NITROGEN AS		Chlorides	Iron
				Nitrates	Nitrites		
ATTLEBORO . . .	10.6	.88	2.1	10.44	.22	32	3.13
BROCKTON . . .	12.6	.67	1.5	21.09	.16	79	2.40
Clinton . . .	4.5	.52	1.2	7.05	.09	32	11.18
Concord . . .	1.1	.08	0.2	7.35	.02	24	.07
Easthampton . .	10.0	.64	1.7	6.85	.27	28	5.38
Framingham (new beds) .	15.9	1.45	2.9	8.24	.41	51	3.29
Framingham (old beds) .	18.8	2.38	3.8	7.54	.35	59	5.60
Franklin	5.9	.69	1.5	6.21	.09	83	1.34
GARDNER (Gardner Area)	22.4	1.48	3.7	7.87	.89	52	2.20
GARDNER (Templeton Area)	22.1	1.50	3.1	16.12	.31	43	2.93
Hopedale . . .	10.2	.27	1.5	17.26	.10	32	.25
Hudson . . .	25.7	2.25	4.5	2.84	.22	47	7.14
Leicester . . .	12.7	1.18	2.5	5.82	.40	20	.50
Marion	2.7	.26	0.8	8.32	.25	32	.59
MARLBOROUGH . .	11.1	.59	1.2	8.50	.23	35	1.85
Milford . . .	40.8	.98	2.0	.60	.02	70	6.16
Natick	23.2	1.12	2.8	3.89	.10	42	4.88
North Attleborough .	5.6	.22	0.7	3.13	.17	17	2.75
Northbridge . . .	5.4	.46	1.7	13.56	.31	26	.42
PITTSFIELD . . .	15.4	1.00	2.0	3.18	.21	26	3.66
Southbridge . . .	24.4	1.11	2.6	3.80	.36	38	4.78
Spencer . . .	15.7	.40	0.8	.77	.21	28	10.83
Stockbridge . . .	1.3	.28	0.6	5.42	.05	14	.94
Westborough . . .	9.9	1.20	2.3	9.08	.49	25	1.92
Winchendon . . .	6.4	.28	0.8	7.80	.18	26	.71

TABLE NO. 6.—*Efficiency of Sand Filters (Per Cent of Free and Albuminoid Ammonia Removed)*

(Parts per Million)

CITY OR TOWN	FREE AMMONIA			TOTAL ALBUMINOID AMMONIA			KJELDAHL NITROGEN			CHLORIDES	
	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent
ATTLEBORO . . .	40.8	10.6	74	7.52	.88	88	16.8	2.1	88	37.	32.
BROCKTON . . .	60.3	12.6	79	7.48	.67	91	16.7	1.5	91	107.	79.
Clinton . . .	22.5	4.5	80	5.48	.52	91	9.4	1.2	89	39.	32.
Concord . . .	17.5	1.1	94	2.65	.08	97	6.2	0.2	97	21.	24.
Easthampton . .	58.9	10.0	83	5.48	.64	88	13.9	1.7	88	38.	28.
Framingham (new beds)	41.0	15.9	61	7.85	1.45	82	12.9	2.9	78	46.	51.
Framingham (old beds) .	36.9	18.8	49	8.90	2.38	73	20.4	3.8	81	46.	59.
Franklin	35.8	5.9	84	4.82	.69	86	10.4	1.5	86	230.	83.
GARDNER (Gardner Area)	69.7	22.4	68	15.03	1.48	90	33.3	3.7	89	56.	52.
GARDNER (Templeton Area)	48.4	22.1	54	5.52	1.50	73	12.8	3.1	76	43.	43.
Hopedale . . .	36.5	10.2	72	3.66	.27	93	7.5	1.5	80	34.	32.
Hudson . . .	57.3	25.7	55	5.94	2.25	62	13.3	4.5	66	52.	47.
Leicester . . .	34.8	12.7	64	5.36	1.18	78	12.6	2.5	80	26.	20.
Marion . . .	21.0	2.7	87	3.05	.26	91	5.5	0.8	85	30.	32.
MARLBOROUGH . .	42.2	11.1	74	5.58	.59	89	11.8	1.2	90	45.	35.
Milford . . .	45.7	40.8	11	6.10	.98	84	13.2	2.0	85	91.	70.
Natick	43.4	23.2	47	8.06	1.12	86	18.4	2.8	85	43.	42.
North Attleborough .	15.9	5.6	65	2.27	.22	90	6.0	0.7	88	18.	17.
Northbridge . . .	30.8	5.4	82	4.62	.46	90	8.9	1.7	81	25.	26.
PITTSFIELD . . .	30.1	15.4	49	4.70	1.00	79	10.1	2.0	80	28.	26.
Southbridge . . .	48.7	24.4	50	8.00	1.11	86	16.8	2.6	85	44.	38.
Spencer . . .	34.2	15.7	54	6.60	.40	94	13.7	0.8	94	31.	28.
Stockbridge . . .	14.1	1.3	91	3.24	.28	91	6.6	0.6	91	13.	14.
Westborough . . .	46.7	9.9	79	9.16	1.20	87	17.9	2.3	87	32.	25.
Winchendon . . .	25.6	6.4	75	2.12	.28	87	6.2	0.8	87	31.	26.

Table No. 7.—*Summary of Efficiency of Sewage Disposal Works. (Per Cent Removal from Raw Sewage to Final Effluent)*

(Parts per Million)

City or Town	Suspended Solids			Free Ammonia			Total Albuminoid Ammonia			Kjeldahl Nitrogen			Oxygen Consumed			Chlorides	
	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent	Per Cent Removal	Raw Sewage	Final Effluent
Attleboro	–	–	–	40.8	10.6	74.	7.52	.88	88.	16.8	2.1	88.	63.5	12.9	80.	37.	32.
Brockton	184.	31.	83.	61.3	12.6	79.	9.98	.67	93.	20.7	1.5	93.	140.3	11.7	92.	90.	79.
Clinton	–	–	–	30.1	4.5	85.	8.82	.52	94.	18.8	1.2	94.	78.7	13.9	82.	45.	32.
Concord	–	–	–	17.5	1.1	94.	2.65	.08	97.	6.2	0.2	97.	28.1	3.2	89.	21.	24.
Easthampton	–	–	–	57.0	10.0	82.	10.96	.64	94.	22.3	1.7	92.	89.5	13.6	85.	43.	28.
Fitchburg	45.	19.	58.	23.1	5.5	76.	3.26	1.57	52.	7.1	3.3	54.	40.9	21.9	46.	28.	28.
Framingham (new beds)	–	–	–	35.8	15.9	56.	7.14	1.45	80.	13.8	2.9	79.	62.5	17.4	72.	43.	51.
Framingham (old beds)	–	–	–	36.9	18.8	49.	8.90	2.38	73.	20.4	3.8	81.	111.3	15.9	86.	46.	59.
Franklin	–	–	–	43.7	5.9	86.	12.56	.69	95.	21.7	1.5	93.	104.7	9.9	91.	344.	83.
Gardner (Gardner Area)	–	–	–	69.7	22.4	68.	15.03	1.48	90.	33.3	3.7	89.	125.8	25.7	80.	56.	52.
Gardner (Templeton Area)	–	–	–	66.8	22.1	67.	11.19	1.50	87.	23.3	3.1	87.	100.7	16.6	84.	51.	43.
Hopedale	–	–	–	55.3	10.2	82.	10.73	.27	97.	26.9	1.5	94.	117.0	10.1	91.	44.	32.
Hudson	–	–	–	68.4	25.7	62.	11.13	2.25	79.	21.8	4.5	79.	98.3	26.1	73.	54.	47.
Leicester	–	–	–	34.8	12.7	64.	5.36	1.18	78.	12.6	2.5	80.	45.0	10.7	76.	26.	20.
Marion	–	–	–	19.4	2.7	86.	3.42	.26	92.	7.0	0.8	89.	37.1	5.5	85.	36.	32.
Marlborough	–	–	–	38.3	11.1	71.	9.80	.59	94.	15.6	1.2	92.	83.7	9.3	89.	55.	35.
Maynard	467.	20.	96.	87.9	27.9	68.	28.79	2.62	91.	35.1	5.2	85.	148.6	27.1	82.	64.	62.
Milford (Sand)	–	–	–	38.1	40.8	–	4.54	.98	78.	10.9	2.0	81.	53.7	19.5	64.	41.	70.
Milford (Imhoff)	125.	26.	79.	38.1	14.0	63.	4.54	1.54	61.	10.9	3.4	68.	53.7	23.0	57.	41.	70.
Natick	–	–	–	43.4	23.2	47.	8.06	1.12	86.	18.4	2.8	85.	71.0	16.2	77.	43.	42.
North Attleborough	–	–	–	16.4	5.6	66.	3.70	.22	94.	7.3	0.7	90.	34.1	4.7	86.	20.	17.
Northbridge	–	–	–	41.9	5.4	87.	9.48	.46	95.	18.2	1.7	91.	71.6	7.1	90.	32.	26.
Pittsfield	–	–	–	38.3	15.4	60.	7.33	1.00	86.	15.2	2.0	87.	62.4	13.3	70.	31.	26.
Southbridge	–	–	–	34.0	24.4	28.	8.24	1.11	87.	18.7	2.6	86.	81.8	13.0	84.	41.	38.
Spencer	–	–	–	34.2	15.7	54.	6.60	.40	94.	13.7	0.8	94.	59.6	10.9	82.	31.	28.
Stockbridge	–	–	–	14.1	1.3	91.	3.24	.28	91.	6.6	0.6	91.	36.3	5.9	84.	13.	14.
Westborough	–	–	–	46.7	9.9	79.	9.16	1.20	87	17.9	2.3	87.	72.5	15.1	79.	32.	25.
Winchendon	–	–	–	25.9	6.4	75.	6.74	.28	96.	17.7	0.8	95.	57.0	7.7	86.	38.	26.
Worcester	360.	48.	87.	24.1	11.9	51.	6.93	.82	88.	16.1	3.0	81.	83.8	24.7	71.	89.	78.

TABLE NO. 8.—*Extent of Sewerage Works, Rate of Flow, and Rate of Operation of Filters*

CITY OR TOWN	Population, Census of 1935	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	ESTIMATED QUANTITY OF SEWAGE TREATED (GALLONS PER DAY)			Estimated Quantity of Sewage per Connection	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Distribution (Gallons per Acre per Day)
				Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow			
ATTLEBORO	21,835	37.31	1,861	887,000	1,471,000	518,000	477	15.50	57,000
BROCKTON	62,407	108.91	8,810	2,889,000[1]	4,854,000	2,154,000	328	37.00	–
Clinton	12,373	25.49	1,932	1,469,000[2]	2,081,000	1,030,000	760	26.23	56,000
Concord	7,723	17.48	751	569,000	895,000	350,000	758	5.48	104,000
Easthampton	10,486	25.81	1,268	–	–	–	–	2.20	–
FITCHBURG	41,700	66.72	–	3,063,000	3,760,000	2,620,000	–	–	–
Framingham	22,651	49.35	3,645	1,309,000	2,026,000	866,000	359	28.56	46,000
Franklin	7,494	14.49	860	223,000	425,000	108,000	259	3.24	69,000
GARDNER	20,397	37.72	2,560	–	–	–	–	16.50	–
Hopedale	3,068	7.08	370	135,000[3]	211,000	–	365	3.79	36,000
Hudson	8,495	14.73	1,164	627,000	942,000	487,000	539	9.00	70,000
Marion	1,867	4.23	242	129,000	275,000	93,000	533	1.53	84,000
MARLBOROUGH	15,781	–	–	909,000	1,239,000	526,000	–	20.19	45,000
Maynard	7,107	8.33	400	88,000	112,000	74,000	220	–	–
Milford	15,008	25.57	1,834	362,000[4]	487,000	276,000	–	9.30	39,000
Nantucket	3,495	22.00	1,631	705,000	951,000	541,000	432	4.00[5]	76,000
Natick	14,394	14.07	1,685	768,000	1,625,000	414,000	456	12.00	64,000[6]
North Attleborough	10,202	17.99	1,067	838,000	1,032,000	610,000	785	8.75	96,000
Northbridge	10,577	15.98	981	855,000	960,000	692,000	872	12.00	71,000
PITTSFIELD	47,516	83.58	6,892	4,872,000	5,826,000	4,247,000	707	41.15	119,000
Southbridge	15,786	23.75	1,751	910,000	1,144,000	565,000	522	12.50	73,000
Westborough	6,073	9.11	613	271,000	497,000	201,000	442	6.62	41,000
Winchendon	6,603	15.5	448	–	–	–	–	4.00	–
WORCESTER	190,471	243.75[7]	–	19,630,000	25,320,000	15,310,000	–	–	–

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[1] Includes an average of 2,481,000 gallons per day to trickling filter and 408,000 gallons to sand filters.

[2] Entire quantity of sewage not treated.

[3] New development not included in average.

[4] Records questionable. Amount to sand filters only.

[5] No underdrains. Filters drain direct to ocean.

[6] Works abandoned in November. New works constructed.

[7] Includes 70.1 miles of combined sewers.

TABLE NO. 9.—*General Features*

CITY OR TOWN	Year of Construction of and Additions to Works	Depth of Underdrains (Feet)	Distance Apart of Underdrains (Feet)	Filtering Material	Attention given to Disposal Works
ATTLEBORO	1912, 1913	4–7	35	Sand and gravel; found in place	One man all the time; others when necessary.
BROCKTON	1893, 1905, 1908, 1912	5.5	30	Sand and gravel; found in place; trickling filter.	One chemist in charge, foreman, day and night man; more when necessary.
Clinton	1898, 1899	8	60–70	Sand and gravel; found in place	Two men all the time; others when necessary.
Concord	1899, 1928, 1934	none	–	Sand underlaid with gravel; found in place	One man once a day.
Easthampton	1908	3.5	20–40	Sand and gravel; largely found in place	One man all the time, others when necessary.
FITCHBURG	1914	–	–	Trickling filter—10 feet deep	Chemist in charge; 1 foreman, 1 day and 2 night men.
Framingham	1890, 1924, 1933	–	–	Sand and gravel	One man all the time; others when necessary.
Franklin	1915	4.5	26	Sand and gravel	Very little attention; one man once in a while.
GARDNER (Gardner Area)	1891	5	20	Sand; handled in construction	One man all the time; others when necessary.
GARDNER (Templeton Area)	1901, 1909, 1931	3–4	20–30	Sand; handled in construction	
Hopedale	1900, 1923	3	35–60	Material—sand and gravel	One man all the time; others when necessary.
Hudson	1904, 1910	5–6	50–100	Sand and gravel; found in place	One man all the time; others when necessary.
Leicester	1894, 1928	4	8	Sand; handled in construction	Very little attention.
Marion	1906, 1930	5	–	Sand; largely found in place	One man every day in summer, every other day in winter.
MARLBOROUGH	1891, 1908, 1909, 1910, 1911	4.5–6	30–50	Sand; found in place	One man all the time; others when necessary.
Maynard	1929	–	–	Trickling filter, 7 feet deep	One man all the time.
Milford	1907, 1924	5	40	Sand; found in place; trickling filter	One man every day; others when necessary.
Nantucket	1930	–	–	Sand and gravel; found in place	One man when necessary.
Natick	1896[4]	6	36	Sand; found in place	One man all the time; others when necessary.
North Attleborough	1909, 1910, 1931	5–6.5	55	Sand and gravel; found in place	One man every day; others when necessary.
Northbridge	1906, 1907, 1920	4	50–75	Sand and gravel; mostly handled	One man all the time; others when necessary.
PITTSFIELD	1901, 1915	4	35	Sand; mostly found in place	One man all the time; others when necessary.
Southbridge	1908, 1925, 1926	4	40	Sand and gravel; considerable quantity handled, some found in place	One man all the time.
Spencer	1897, 1923	–[1]	–	Sand and gravel; largely found in place	One man all the time; others when necessary.
Stockbridge	1899, 1921, 1922	3–4.5	23	Sand filters	One man all the time.
		3.4–5	30	Irrigation area, sand	
Westborough	1892, 1911	5	30–40	Sand and gravel; handled in construction	One man all the time; others when necessary.
Winchendon	1928	–	–	Sand and gravel; found in place	One man part time.
WORCESTER	1898[2],[3], 1925	4–6	35–50	Trickling filters, sand area not in use	Chemist in charge; several men all the time.

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[1] Only three beds underdrained.

[2] Year of first construction of sand filters. Many additions.

[4] Sand filters abandoned Nov., 1935. Imhoff tank, trickling filter and secondary tank installed.

[3] Sedimentation tanks and sand beds abandoned 1925. Imhoff tanks, trickling filters and secondary tanks installed.

Examination of Sewer Outlets Discharging into the Sea

Examinations were made of certain of the sewer outlets discharging into the sea, and conditions were found to be satisfactory except in connection with the discharge of sewage into some of the waterways tributary to Boston Harbor, the disposal of sewage from the South Essex Sewerage District, outlets near the shore in the city of Fall River and from certain municipalities discharging into the Connecticut River. It will be necessary in the near future to provide a trunk sewer for the city of Fall River as recommended by the Department if a nuisance in the waters adjacent to that municipality is to be prevented. It also is important that certain of the sewers discharging into the Connecticut River should be provided with outlets for the dry-weather flow extending into deep water where they will be submerged at all times.

Shellfish

In accordance with its duties under Chapter 130 of the General Laws, this Division has considered various applications and petitions relating to the removal of restrictions on the taking of shellfish from certain areas along the seacoast, has assisted in prosecution of cases against dealers handling polluted shellfish and has attended hearings held by the Supervisor of Marine Fisheries relative to the cancellation of certificates because of their improper use and because of insanitary shucking facilities. During the year the Department acted on 235 applications for the approval of certificates for shipping shellfish into the State from other producing states and provinces. The Department also has continued its investigations of shucking plants and has maintained its supervision over shellfish chlorinating plants. At the end of the year there were two plants in operation for the purification of shellfish, one at Newburyport and one at Plymouth. It is estimated that a total of 12,605 barrels of soft shell clams were treated at the Newburyport plant and 13,840 at the Plymouth plant.

Special Investigations

In accordance with the direction of the Legislature this Division during the year 1935 assisted in a number of special legislative investigations. One of these was under the direction of the Commissioner of Public Health acting jointly with the Commissioner of Public Safety and the Commissioner of Public Welfare in the matter of overnight camps and cabins, as directed by the Senate Order adopted on April 11, 1935. One was an investigation under the direction of the Commissioner of Conservation and the Commissioner of Public Health acting jointly in the matter of the development of Cedar Swamp Pond in the town of Milford, as required under Chapter 28 of the Resolves of 1935; and another was an investigation under the direction of the Commissioner of Conservation and the Commissioner of Public Health, relative to the acquisition by the Commonwealth of certain islands in Salem Bay and vicinity and the use thereof for certain public purposes, as authorized under Chapter 30 of the Resolves of 1935. An investigation was commenced, as authorized under Chapter 42 of the Resolves of 1935, relative to the discharge of sewage from the Metropolitan Sewerage District and the Boston Main Drainage District and from other sources into Boston Harbor. This latter investigation was under the direction of a joint board consisting of the Commissioner of Public Works, the Commissioner of Public Health, the Commissioner of the Metropolitan District Commission, the Health Commissioner of the city of Boston, and the Commissioner of Public Works of the city of Boston. Reports as required under these resolves have been submitted to the Legislature. In addition, this Division has assisted the Metropolitan District Commission and the Department of Public Works in their studies of beaches and other recreational facilities as required under Chapter 50 of the Resolves of 1935.

Federal Public Works, Emergency Relief Administration and Works Progress Administration Projects

As was the case in 1934 a considerable amount of time of the Division has been occupied with investigations and studies of various construction projects undertaken through the Public Works Administration, Emergency Relief Administration and Works Progress Administration of the Federal Government. The following table shows the Federal projects on water and sewerage brought to the attention of this Division in 1935:

Water Supply

Under P.W.A.

Leominster	Filter plant
Northborough	Filter plant
Pittsfield	Construction of reservoir
Reading	Iron removal plant
Tewksbury	Additional water supply at State Infirmary
Woburn	Test wells and additional water supply

Under F.E.R.A. or W.P.A.

Brockton	Effect of construction on safety of water main
Brookline	Improvement of well field
Clinton	Cleaning reservoir
Clinton	Improvement of watershed
Colrain	Improvement of watershed
Danvers	Improvement of watershed
Deerfield	Improvement of water supply
Gloucester	Removal of top soil
Hanover	Improvement of well field
Lancaster	Test wells and pumping test
Northborough	Improvement of watershed
Pittsfield	Cleaning reservoir site
Randolph	Improvement of watershed
Scituate	Improvement of well field
Springfield	Improvement of watershed
Taunton	Improvement of watershed
Westfield	Improvement of watershed
Williamsburg	Improvement of watershed
Worcester	Protection of water supply

Sewerage and Sewage Disposal

Under P.W.A.

Auburn	Disposal works at High School
Auburn	Sewage Disposal at Athletic Field
Barnstable	Sewerage system for Hyannis
Chicopee	Sewers in James St. and Riverview Rd.
Chicopee	Sewer in Plainfield St.
Deerfield	Proposed sewerage system
Fall River	Sewage collection and treatment
Foxborough	Sewage filters at State Hospital
Framingham	Additional treatment works
Mansfield	Sewerage system for town
Monson	Sewage treatment works, State Hospital
Pittsfield	Additional sewage disposal works
So. Essex Sewerage Dist.	Grease and grit chamber
Worcester	Disposal works at Worcester County Sanatorium

Under F.E.R.A. or W.P.A.

Amherst	Extension sewerage system
Dudley	Sewer in W. Main St.
Fairhaven	Emergency outlet at Bridge St.
Foxborough	Sewage disposal, Elm St. drainage project
Montague	Sewerage system for Turners Falls
Spencer	Additional sewage filters
Tewksbury	Filters at State Infirmary
Williamstown	Sewers

EXAMINATIONS OF RECREATION CAMPS AND ROADSIDE STANDS

A large number of overnight camps and cabins were examined during the year under the Senate Order dated April 11, 1935, and the results of the investigation were submitted to the Legislature in a separate document. In addition water supply and sewerage works were examined where requested at recreational camps and roadside stands.

CIVILIAN CONSERVATION CORPS CAMPS

It has been the practice of the Engineering Division for the past two years to examine the water supplies and works for the disposal of sewage at the C.C.C. camps when requested and to make regular bacterial examinations of samples of the water supplied to these camps. During the year 1935, 642 samples of water were examined, and the results of these examinations were communicated to the office of the Corps Surgeon, First Corps Area, Army Base, Boston. The following table summarizes the results of the bacterial examinations of samples of water collected from these camps during the year 1935. Re-examinations of some of the sources of water supply by engineers from this office lead us to be of the opinion that some of the unfavorable bacterial counts are due to improper collection of the samples submitted.

Location of Camp			Water Supply				
U. S. Army No.	City or Town	Reservation—(R) or State Forest—(S.F.)	Source	Treatment	Bacterial Condition (B. Coli-Aerogenes)		
					(1 cc portions)	(10 cc portions)	
					% Positive	% Positive	% Negative
11035	Agawam	Robinson Park (R)	Springfield Supply	Filtered	0	0	100
2142	Andover	Harold Parker (S.F.)	Drilled Well	Chlorinated	0	0	100
4103	Andover	Harold Parker (S.F.)	Dug Well	Chlorinated	8	17	83
11045	Athol	Athol (S.F.)	Tubular Well	–	0	22	78
2154–1	Becket	October Mt. (S.F.)	Drilled Well	–	0	12	88
2154–2	Becket	October Mt. (S.F.)	Drilled Well	–	0	0	100
11052	Belchertown	–	Tubular Well	–	0	0	100
2164–1	Bourne	Shawme (S.F.)	Tubular Wells	–	0	0	100
2164–2	Bourne	Shawme (S.F.)	Tubular Wells	–	0	0	100
11030	Brewster	Nickerson Park (R)	Tubular Well	Chlorinated	33	67	33
2147	Brimfield	Brimfield (S.F.)	Dug Well and Springs	–	8	14	86
2162	Charlemont	Mohawk Trail (S.F.)	Springs	–	0	9	91
2149	Chester	Chester-Blandford (S.F.)	Well	Chlorinated	8	8	92
2199	Chicopee	Chicopee Water Supply (R.)	City Supply	Filtered and Chlorinated	0	0	100
4107	Douglas	Douglas (S.F.)	Drilled Well	–	0	33	67
11041	Douglas	Douglas (S.F.)	Town Supply	–	0	7	93
2146	Erving	Erving (S.F.)	Dug Well	–	0	0	100
2171	Fall River	Fall River Water Supply (R.)	City Supply	Chlorinated	0	0	100
2169	Foxboro	Foxboro (S.F.)	Town Supply	–	0	0	100
11046	Franklin	Park (R.)	Town Supply	–	0	0	100
4108	Freetown	Freetown (S.F.)	Drilled Well	–	0	0	100
11037	Freetown	Freetown (S.F.)	Drilled Well	–	0	0	100
2148	Goshen	Conway and D.A.R. (S.F.)	Drilled Well	–	0	0	100
2150	Granville	Granville (S.F.)	Springs	–	0	22	78
2153	Great Barrington	Beartown (S.F.)	Springs	–	0	18	82
11050	Greenfield	–	Town Supply	Chlorinated	0	0	100
11034	Hancock	Pittsfield (S.F.)	Drilled Well	–	0	0	100
11033	Hawley	Hawley (S.F.)	Springs	–	0	3	97
11047	Heath	Colrain (S.F.)	Spring	–	0	10	90
11029	Holyoke	Mt. Tom (R.)	Drilled Well	–	0	0	100
11039	Lenox	October Mt. (S.F.)	Pittsfield Supply	Chlorinated	0	0	100
2170	Milton	Metropolitan Parks (R.)	Metropolitan Supply	Chlorinated	0	0	100
2157	Monroe	Monroe (S.F.)	Brook	–	0	3	97
11059	Montague	–	Turners Falls Fire District Supply	–	0	4	96
11031	Mount Washington	Bash Bish (S.F.)	Tubular Well	–	10	26	74

Location of Camp			*Water Supply*				
U. S. Army No.	City or Town	Reservation—(R) or State Forest—(S.F.)	Source	Treatment	Bacterial Condition (B. Coli-Aerogenes) (1 cc portions) % Positive	(10 cc portions) % Positive	% Negative
2152	New Marlborough	Sandisfield (S.F.)	Spring	–	0	0	100
2151	Otis	Otis (S.F.)	Spring and Well	–	0	8	92
2161	Otis	Otis (S.F.)	Well	–	0	4	96
2155	Peru	Peru (S.F.)	Brook and Spring	Chlorinated	0	0	100
2159	Pittsfield	Pittsfield (S.F.)	Brook	–	0	2	98
2163–1	Plymouth	Myles Standish (S.F.)	Tubular Wells	–	0	0	100
2163–2	Plymouth	Myles Standish (S.F.)	Tubular Wells	–	0	0	100
11028	Saugus	Metropolitan Parks (R.)	Lynn Supply	–	0	0	100
2158	Savoy	Savoy Mountain (S.F.)	Springs	–	0	0	100
4106	Savoy	Savoy Park (S.F.)	Well	Chlorinated	0	0	100
11032	Savoy	Savoy Mountain (S.F.)	Brook	–	0	13	87
11043	Savoy	Mohawk Trail (S.F.)	Brook	–	0	15	85
2160	Spencer	Spencer-Oakham (S.F.)	Tubular Wells	Chlorinated	0	5	95
11040	Sutton	Sutton (S.F.)	Tubular Well	–	0	0	100
11038	Townsend	Willard Brook (S.F.)	Dug Well	–	0	0	100
11044	Townsend	Willard Brook (S.F.)	Dug Well	–	0	0	100
11036	Upton	Upton (S.F.)	Tubular Well	–	50	75	25
11042	Warwick	Warwick (S.F.)	Dug Well	–	9	49	51
11048	Warwick	Warwick (S.F.)	Dug Well	–	0	15	85
2145	Wendell	Wendell (S.F.)	Dug Well	–	20	26	74
11051	Westfield	–	Holyoke	–	0	0	100
2143	Westminster	Leominster (S.F.)	Well	–	14	40	60
2198	Williamstown	Mt. Greylock (R.)	Brook	–	8	20	80
2144	Winchendon	Otter River (S.F.)	Tubular Wells	–	8	12	88
2156	Windsor	Windsor-Hawley (S.F.)	Spring	–	0	0	100

Samples collected by camp surgeons.

Examination of Bathing Places

The examination of bathing places included the work of the Division in assisting the Metropolitan District Commission and the Department of Public Works in their investigation of certain bathing places as required under Chapter 50 of the Resolves of 1935, in addition to those in other parts of the State. The following bathing places were examined:

Advice Relative to Bathing Places and Swimming Pools

Agawam	Connecticut River
Andover	Abbot Pond at Abbot Academy
Arlington	Spy Pond and Reservoir at Arlington Heights
Ashland	Swimming Pool on premises of Workmen's Circle Camp (Golden Ring Camp)
Boston and Metropolitan Parks Districts	Charles River Basin
	Bathing beaches in vicinity of Neponset River in Boston Milton
	Charles River in Waltham Cambridge Watertown
	Mystic River in Somerville Arlington
	Dark Hollow Pond in Stoneham
	Houghton's Pond in Milton
Boxford	Four Mile Pond at North Bennet Street Industrial School Camp
Braintree	Weymouth Fore River near Watson Field
Dudley	Use of abandoned [illegible] pit for bathing
Franklin	Swimming pool on small brook near West Central Street
Franklin	Swimming pool at [illegible] Central Street
Gardner	Nashua Reservoir [illegible] Camp Collier
Grafton	Pratt's and Hayes' [illegible]
Great Barrington	Lake Mansfield as [illegible] bathing pool
Hardwick	Wading pool at Har[illegible] Center
Hinsdale	Lake Ashmere
Holden	Forebay at Old Dawson [illegible]
Hopedale	Use of Pond on Mill River [illegible] bathing
Hudson	Lake Boone
Huntington	Norwich Pond
Lakeville	Loon Pond
Leicester	Swimming pool on Stevens Estate, Baily Road
Leominster	Pollution of Beaches at Whalom Lake
Longmeadow	Swimming pool on Cooley Brook
Mansfield	Proposed bathing pool on Wading River
Medfield	Proposed swimming pool on Vine Brook
Methuen	Merrimack River
Middleborough	Municipal swimming pool
Milford	Bathing beach at Cedar Swamp Pond
Natick	None Such Pond at Camp Mary Day
Needham	Rosemary Lake
New Bedford	Pond at Buttonwood Park
Newburyport	Merrimack River (foot of Green Street)
North Andover	Stevens Pond
Northfield	Swimming pool at Skinner Gymnasium, Northfield Seminary
North Reading	Martins Pond

Advice Relative to Bathing Places and Swimming Pools—Concluded

Norwood	New Pond (Willett Pond)
Pembroke	Hobomock Pond
Plymouth	Long Pond
Quincy	Swimming pool at Y. M. C. A.
Rockland	Reeds Pond (Studley's Pond)
Russell	Swimming pool on Freeland Brook
Rutland	Pond at Veterans' Reservation
Shirley	Swimming pool at Industrial School for Boys
Shrewsbury	Swimming pool in Dean Park
South Hadley	Paradise Pond
Sterling	East Waushaccum Lake
Stoneham	Dark Hollow Pond (Duck Pond)
Stow	Swimming pool at Stow Country Club
Sudbury	Proposed swimming pool on Dudley Brook in South Sudbury
Tewksbury	Long Pond
Uxbridge	Pout Pond
Wakefield	Lake Quannapowitt
Warwick	Bathing pool at Transient Camp
Warren	Quaboag River at West Warren
Watertown	Charles River Basin
Webster	Bathing Beach on town land adjacent to Lake Chaubunagungamaug
Wellesley	Bathing beach on Morses Pond
Westborough	Swimming pool at Lyman School for Boys
West Bridgewater	Swimming pool on Town River in Memorial Park
Westwood	Proposed swimming pool at Scoutland
Westwood	Swimming pool on watershed of Rock Meadow Brook
Winchester	Aberjona River (Leonard Field Beach)

Community Sanitation Project

During the year 1935 this Division commenced a Community Sanitation Project relative to rural schoolhouses. This project is being financed with funds of the Federal Government and is under the supervision of an Assistant State Director, who is paid by the United States Public Health Service. Plans have been and are being prepared for various types of water supplies and works for the disposal of sewage at various rural schoolhouses.

WATER AND SEWAGE LABORATORIES
AND
LAWRENCE EXPERIMENT STATION

In accordance with an established policy, the activities of the Water and Sewage Laboratories and the Lawrence Experiment Station during the year 1935 were divided into analytical and research work and, because of the large amount of work required in carrying out certain studies under the resolves of the Legislature and under Federal projects, the volume of work was considerably in excess of any undertaken during previous years.

WATER AND SEWAGE LABORATORIES

During the year 9,216 chemical analyses and 3,583 microscopical examinations were made and in addition many special determinations were made, such as manganese, fats, suspended solids, alkalinity, hydrogen ion, biochemical oxygen demand and dissolved oxygen. Other special determinations were made, such as carbonic acid, lead, copper, arsenic, settleable solids, phenols, oil, and moisture. Special studies were undertaken in these laboratories to determine the effect of waters having a high variable and a high constant carbon dioxide content on an iron-bearing soil; the action of ground water in contact with sand collected in certain districts, with special reference to the amount of iron dissolved from the sand by the water, and determinations of oil in sand from certain beaches on Cape Cod to ascertain the amount of oil separating out from this sand when mixed with salt water of varying temperatures.

Mineral analyses were made of the water of the North, Middle and South reservoirs, sources of water supply for the town of Winchester. Special analyses and studies were made relative to the overboard discharge of wastes from the Massachusetts Gas Company into the Mystic River in Everett and of samples of mud collected from the Pegan filters used in connection with the water supply of the Metropolitan District Commission at Natick. Many analyses were made of samples of salt water, sewage, screenings and mud as part of a study concerning the disposal of sewage in Boston Harbor, under Chapter 42 of the Resolves of 1935. An examination of a sample of water from the Metropolitan water supply at the end of the Sudbury Aqueduct, Chestnut Hill, for odor and taste was made, and in this connection several samples of water from this aqueduct were analyzed for phenols. During the year an analysis of material collected from the wall of the Sudbury Aqueduct, near Framingham, when it was being cleaned, showed the presence of a considerable amount of tar. Analyses were made, also, to advise relative to the treatment of boiler water at one of our large institutions.

The following table gives a summary of the analytical work carried on in the State House laboratories:

Water and Sewage Laboratories, State House

Samples from public water supplies:	
Surface waters	2,468
Ground waters	1,421
Special samples:	
Surface waters	303
Ground waters	786
Samples from rivers	1,264
Samples from sewerage systems and sewage disposal works	1,327
Samples of wastes and effluents from factories	40
Samples analyzed in connection with the Boston Harbor Investigation under Chapter 42 of the Resolves of 1935	1,349
Miscellaneous samples (partial analyses)	258
Special examinations of water (including field work) for manganese, lead, copper, arsenic, settleable solids, phenols, moisture, oil and carbonic acid	232
Microscopical examinations	3,583
Mineral analyses	3

In response to many requests for information concerning the mineral content of the waters of some of our public water supplies, the following table is presented:

Mineral Analyses
(Parts per Million)

City or Town	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total Hardness as $CaCO_3$**	Total Dissolved Solids
Attleboro*	4.5	0.04	13	1.9	3.4	0.8	16	16	5.5	.33	40	53
Beverly	4.3	.22	14	3.0	6.8	1.2	26	22	11	.66	47	89
Brockton	3.8	.07	2.1	.9	4.1	1.2	8.5	6.5	7.4	.0	9	36
Brookline*	14	2.1	27	4.3	9.6	1.5	49	29	10	1.5	85	128
Cambridge	5.8	.12	15	2.5	5.5	1.8	22	26	7.4	1.1	48	91
Chicopee	9.4	.10	6.4	.9	2.7	.6	18	6.0	3.2	2.5	20	49
Fall River	1.7	.14	3.0	.7	4.0	.8	8.5	11	6.4	.0	10	40
Fitchburg	3.6	.20	3.0	.6	2.1	.8	9.8	9.2	2.0	.09	10	35
Framingham	2.4	.20	4.7	.4	3.5	1.0	15	9.7	3.0	.09	13	40
Gloucester	2.8	.38	2.7	1.3	5.7	2.7	7.3	10	12	1.1	12	60
Haverhill	.8	.09	9.8	1.4	3.5	1.7	21	11	5.6	.09	30	58
Holyoke	6.1	.09	6.8	1.4	1.8	.5	22	7.6	2.7	.09	23	48
Lawrence	6.3	.57	6.0	.9	4.1	2.4	18	10	6.6	1.1	19	55
Leominster	7.2	.18	4.8	.8	2.9	.7	9.8	13	2.5	.13	15	60
Lowell*	11	4.2	12	1.2	5.7	2.5	43	8.3	8.7	.97	35	124
Lynn	4.3	.34	8.7	3.3	5.2	1.0	20	16	8.1	.13	35	76
Methuen*	12	.65	16	1.1	4.4	2.4	31	9.9	7.0	1.6	45	86
Metropolitan	2.1	.12	4.4	1.0	3.9†		16	9.9	3.2	.31	15	43
Nantucket*	4.3	.03	4.7	1.9	11	.6	11	6.2	18	.18	19	58
New Bedford	2.2	.11	3.4	1.1	4.2	1.0	12	10	6.2	.0	13	43
Newton*	11	.16	12	2.8	6.2	1.2	27	18	9.2	.97	41	108
North Adams	4.6	.05	6.9	1.2	1.3	.8	23	7.2	1.2	.0	22	42
Northampton	6.5	.10	9.4	1.2	1.7	.9	27	6.9	2.4	.09	28	51
North Andover	1.8	.22	5.9	1.4	4.7†		13	14	4.9	.27	20	49
Orange	7.5	.05	2.5	.6	2.0	.4	9.8	4.4	2.1	.0	9	34
Peabody	6.8	.20	8.1	3.2	5.0	2.3	17	16	10	1.2	33	81
Pittsfield	3.4	.13	16	4.7	1.0	.6	49	9.7	2.4	1.09	59	67
Provincetown*	7.4	.17	4.6	3.5	22	.3	13	5.0	41	.0	26	108
Springfield	3.6	.12	5.2	1.2	2.0	1.0	12	11	1.5	.15	18	43
Taunton	1.6	.17	2.0	.9	3.9	.9	7.3	7.7	4.5	.09	9	33
Tisbury*	8.8	.08	1.2	.1	6.8	.6	12	3.5	11	.0	3	39
Walpole*	10	.08	5.6	1.5	4.5†		23	7.7	4.9	2.0	20	53
Waltham*	8.4	.03	19	3.5	4.3	3.1	29	25	8.2	2.1	62	97
Weymouth	4.7	.30	3.4	1.5	3.2	1.2	7.3	14	6.1	.09	15	56
Winchester	1.5	.11	6.5	1.1	3.1	.3	12	11	4.0	.13	21	45
Worcester	2.4	.11	3.4	.6	3.3	1.0	8.5	8.1	1.9	.0	11	30

* Ground Water.

** Calculated.

† Na + K as Na.

LAWRENCE EXPERIMENT STATION

During the year 1935 much work was done by the staff of the Lawrence Experiment Station in connection with the examination of rivers, water supplies, swimming pools, and sewage filtration areas. Considerable attention was paid to the condition of shellfish and shellfish areas and to the work of bacteriological laboratories at shellfish purification plants, and a bacteriologist from the Station was in court six times to testify in the prosecution of cases of violation of the shellfish laws. Studies were made of the bacterial content of scallops and the effect of various methods of cooking. Scallop meats prepared for market under clean conditions contain practically no coli-aerogenes. Some were found to be grossly contaminated, and these were not rendered safe by frying or stewing.

Many reports were made in regard to sewage and trade waste disposal, water purification, chlorine treatment, the condition of water supplies, swimming pools, bathing beaches, the removal of free carbon dioxide from water supplies, and other laboratory field work of various kinds.

Unsuccessful tests were made with iron and manganese sludge for removal of iron and manganese from water along the lines of the activated sludge process. Claims have been advanced that relatively small amounts of copper sulphate with caustic soda or soda ash aid in iron removal from some waters. Experiments with four iron-bearing waters (Lowell, Reading, Amesbury and Georgetown) showed that soda and copper sulphate were of no practical value in iron removal from these waters.

Relative stability tests were made on the effluents from many of the municipal sewage disposal areas. The surveys of the Housatonic, Blackstone and Nashua rivers, under the Federal Works Progress Administration program, necessitated the making of many analyses which included a considerable number of B.O.D. determinations on samples of trade wastes entering and of water from these rivers. B.O.D. determinations were made also in connection with the Merrimack River.

Much research work on methods of sewage purification and water treatment was carried on at the Experiment Station and in this connection the study of the relative efficiency of aeration and chlorination as a preliminary treatment of sewage before application to trickling filters was continued, but at a higher rate than last year. Studies were made of the treatment by a sand filter of a distillery waste mixed with sewage and of the effect on the operation of sand and trickling filters of adding wool-scouring wastes to sewage. Tests were made of the effect on color and bacteria of high dosages of chlorine to highly colored waters.

As slow sand filtration has proved to be an effective and important method of sewage disposal in Massachusetts, particularly in the smaller communities, and as properly constructed and operated filters of this type are very efficient, studies have been made the past four years with the object of increasing the efficiency of the various municipal filtration areas. These studies show that for the best results, a sand filter should be flooded daily, the sewage being applied as rapidly as practicable to secure even distribution. It is, unfortunately, the practice in many places to overdose filters at intervals of several days. To demonstrate the effect of such operation, two series of filters of seven filters each are in operation at the Experiment Station. Each of the seven filters receives the same amount of sewage per week but the first is flooded every day, the second every second day and so on to the seventh which is flooded only once a week. Another series, consisting of filters from 1 foot to 5 feet in depth, is operated for the study of the degree of purification obtainable from filters of different depths of sand.

The important study, which was begun six years ago, in regard to the purification of the very polluted Merrimack River water by storage was continued throughout the year 1935. In this study the river water was passed through underground tanks, containing seven compartments, at such a rate that during the year it received, theoretically, thirty days' storage. By this storage, the number of bacteria of the coli-aerogenes group has been reduced from 2,200 to 23 per 100 cubic centimeters, thus showing the great efficiency of purification by storage for a water even as polluted as that of the Merrimack River. Such purification by storage, if properly controlled at all times, might make a very slightly polluted supply safe without further treatment. In the case of a very polluted water, storage is a valuable treatment prior to filtration.

A study also was continued to determine the amount of iron taken up by water in passing through different materials. This is of interest in connection with ground water supplies.

As has been the custom for the past forty-two years, the Lawrence Experiment Station force has maintained a general oversight of the operation and the bacterial efficiency of the Lawrence city filters. This oversight included inspection of the chlorine plant and the almost daily bacterial examination of samples of the water before and after filtration. This has been necessary as during all these years the city has never employed a trained operator at the filters or provided other laboratory control. In addition, all water, sewage and shellfish bacterial work, including such work in connection with the general oversight of inland waters, has been done at the Lawrence Experiment Station. During the year cooperative studies were made with the laboratory of the Metropolitan District Commission concerning bacterial analyses.

The State House laboratories and the Lawrence Experiment Station were visited during the year by many persons, including representatives of various colleges, interested in water and sewage purification, analytical and other work, and as usual a number of these visitors were from foreign countries.

The analytical work carried on at the Experiment Station is summarized in the following table and a resumé of some of the research work is submitted in the following pages:

Lawrence Experiment Station

Chemical analyses on account of investigations concerning the disposal of domestic sewage and factory wastes, filtration and other treatment of water supplies, swimming pools, and the investigation of the Merrimack and other rivers	2,743
Mechanical and chemical analyses of sands	181
Bacterial examinations of water supplies, rivers, sewage and filter effluents, ice, swimming pools, wastes, and sea water	8,948
Bacterial examinations in connection with methods of purification of sewage and water	597
Bacterial examinations of shellfish	622

TESTS ON THE RAPIDITY OF THE BACTERICIDAL ACTION OF CHLORINE

To study the necessity in treatment of water supplies of adding sufficient chlorine to obtain excess chlorine of certain amounts and also the effect of adding chlorine considerably in excess of the immediate demand, several experiments were carried on at the Lawrence Experiment Station on waters relatively high in color and organic matter, and relatively low in bacteria. One one-hundredth of a cubic centimeter of Lawrence sewage per gallon was added to allow a more definite estimation of bactericidal action. Check determinations were run which showed that this small amount of sewage had practically no effect on color or chlorine demand. At intervals of one, two, three, five, seven, ten, fifteen and thirty minutes after the chlorine was applied, determinations of color and residual chlorine were made, and after neutralizing the residual chlorine with sterilized sodium thiosulphate solution, bacterial analyses were made.

The following table shows the results of an experiment using water from a typical water works reservoir. Results of the other series were entirely similar. These results indicate that practically all the bactericidal action of chlorine follows almost at once the satisfaction of a reasonable part of the immediate chlorine demand but that reduction of color continues as long as any free chlorine remains.

Table Showing Effect on Color and Bacteria of Different Periods of Contact of Chlorine and of Varying Amounts of Chlorine

Minutes after Treatment	Residual Chlorine	Color	BACTERIA PER CUBIC CENTIMETER			Coli-Aerogenes Group in 100 cc.
	(Parts per Million)		4 Days 20°C.	24 Hours—37°C.		
				Total	Red	
Reservoir Water Before Chlorine Treatment						
–	–	50	340	6	1	8
0.5 p.p.m. Chlorine added						
1	0.006	48	14	4	0	0
2	0.003	47	10	2	0	0
3	0.002	47	8	1	0	0
5	0.001	47	9	0	0	0
7	0.000	47	4	1	0	0
10	0.000	47	7	1	0	0
15	0.000	47	5	1	0	0
30	0.000	47	5	1	0	0
1.0 p.p.m. Chlorine added						
1	0.30	48	5	2	0	0
2	0.15	47	6	2	0	0
3	0.15	47	7	2	0	0
5	0.13	47	4	1	0	0
7	0.06	47	4	2	0	0
10	0.04	47	4	3	0	0
15	0.04	47	5	1	0	0
30	0.003	47	6	2	0	0
1.5 p.p.m. Chlorine added						
1	0.7	47	10	2	0	0
2	0.5	47	7	1	0	0
3	0.4	46	7	1	0	0
5	0.3	45	6	1	0	0
7	0.3	45	8	0	0	0
10	0.2	45	6	1	0	0
15	0.2	43	4	0	0	0
30	0.005	42	2	0	0	0
2.0 p.p.m. Chlorine added						
1	0.9	47	11	1	0	0
2	0.7	47	8	1	0	0
3	0.5	47	14	0	0	0
5	0.5	45	9	3	0	0
7	0.3	45	7	1	0	0
10	0.3	45	8	1	0	0
15	0.2	44	8	2	0	0
30	0.005	43	6	0	0	0
2.5 p.p.m. Chlorine added						
1	1.8	48	12	4	0	0
2	1.3	46	10	0	0	0
3	1.2	45	8	1	0	0
5	1.1	45	12	1	0	0
7	1.1	45	7	1	0	0
10	0.9	43	8	1	0	0
15	0.7	42	4	1	0	0
30	0.4	41	4	0	0	0
3.0 p.p.m. Chlorine added						
1	2.0	48	18	2	0	0
2	1.9	48	12	2	0	0
3	1.8	48	13	2	0	0
5	1.6	44	6	2	0	0
7	1.5	44	6	5	0	0
10	1.3	44	6	1	0	0
15	1.0	44	2	0	0	0
30	0.6	40	1	0	0	0

DISPOSAL OF DISTILLERY WASTE

Wastes from the distillation of rum consist mainly of diluted molasses minus the sugars which have been converted to alcohol and distilled off. Such wastes are quite stable and no appreciable decomposition takes place on standing. The average total solid matter in the wastes examined was .58 per cent, the organic matter .46 per cent, and organic nitrogen 1,360 parts per million. It was impossible to treat such a waste by chemical precipitation and it was too concentrated to treat by bacterial processes. If this waste had been discharged into the sewers of the town where the distillery was located, it would have been equal to about 1 per cent of the total volume of the sewage and would have increased the albuminoid ammonia content of this sewage about 64 per cent and the oxygen consumed 184 per cent.

To determine the effect on a sand filter of adding this waste to sewage, a small filter, No. 635, was operated at the Experiment Station with Lawrence sewage to which 1 per cent of the distillery waste had been added. This filter handled the mixture of sewage and waste in this proportion without difficulty but much of the color due to the molasses came through the filter unchanged and the oxygen consumed was high, due partly to this coloring matter. The nitrogenous matter of the molasses is apparently in a stable form, not easily acted upon by the bacteria of the filter. In spite of the high organic matter, the effluent was well purified and stable. This filter, being made of clean sand of suitable size, experienced no ill effect from the waste but the effect on the municipal beds, which are of poorly graded material and handle the municipal sewage with difficulty, probably would have been more unfavorable.

Average Analyses of Samples of Waste, Sewage and Sewage Effluents Relative to the Treatment of Distillery Waste with Domestic Sewage

(Parts per Million)

	Ammonia			Kjeldahl Nitrogen			Nitrogen as—		
		Albuminoid							
Color	Free	Total	In Solution	Total	In Solution	Chlorides	Nitrates	Nitrites	Oxygen Consumed
Distillery Waste									
–	56.0	660.	540.	1360.	1113.	–	–	–	18600.
Settled Sewage applied to Sand Filter No. 591 (no distillery waste added)									
–	31.1	6.80	4.33	12.	7.5	51	–	–	40.
Effluent from Sand Filter No. 591 (no distillery waste added to applied sewage)									
10	.522	.217	–	–	–	52	27.1	.08	2.0
Settled Sewage and Distillery Waste (1.0% applied to Sand Filter No. 635)									
–	34.7	12.0	8.9	21.	15.	76	–	–	183.
Effluent from Sand Filter No. 635 (1.0% distillery waste added to applied sewage)									
200	.394	1.47	–	–	–	75	24.9	.06	25.

EFFECT OF DISCHARGING WOOL-SCOURING WASTE INTO A MUNICIPAL SEWERAGE SYSTEM

It is well known that wool-scouring wastes (wool-scourings, so called), because of their high content of organic matter and fats, are very difficult to purify. In a certain town it was desired to discharge into the sewers about 7,500 gallons of such wastes daily during the summer in order to relieve the pollution of a small stream used for bathing. It was feared that the wastes would have an injurious effect on the filters receiving the sewage from this town. To obtain information on this matter, two sand and two trickling experimental filters were operated at the Lawrence Experiment Station.

It was estimated that the wool-scourings would equal about 0.6 per cent of the flow of sewage but to allow a safe margin 1.0 per cent of such wastes was mixed with the Lawrence sewage and applied to two of the four filters. The other two were run as controls with sewage only. As it was planned to settle the wastes for twenty-four hours before allowing them to enter the sewer, the wastes applied to these filters were settled that length of time. From February to August, 1935, two sand filters, containing 3½ feet in depth of sand of an effective size of .25 millimeter, were operated at a rate of 42,000 gallons per acre daily. One of the filters, No. 591, received sewage only, and the other, No. 637, received the settled waste and sewage. Two trickling filters, containing 10 feet in depth of crushed stone from ¾ inch to 1½ inches in diameter, were operated from March to July, at a rate of 1,500,000 gallons per acre daily. Filter No. 571 received sewage only and

Filter No. 638 received sewage with 1 per cent of wool-scouring wastes. The average analyses, excluding the results obtained while the new filters were getting in good condition, are shown in a following table.

The effluent from the sand filter receiving the wastes was somewhat higher than the control in free and albuminoid ammonia and oxygen consumed but still was of very good quality. There was no clogging of the sand after seven months' operation, although eventually an accumulation of the grease from the wool-scouring wastes might be expected. There is reason for believing that some of this grease will separate out after mixing with sewage and be removed in the Imhoff tank at the treatment plant. It is evident that 1 per cent of wool-scourings in sewage will not interfere with the operation of a properly constructed sand filter but may require the removal of some sand in the future. The effluent from the trickling filter receiving the wastes was of practically the same quality as the control; in fact, it was slightly lower in B.O.D. and had a higher relative stability. With the trickling filter, the fat from wool-scourings is of little account because there will be no accumulation as in sand filters.

Average Analyses of Samples of Wool-Scourings, Sewage and Sewage Effluents Relating to the Treatment of Wool-Scourings with Domestic Sewage

(Parts per Million)

Color	Ammonia			Kjeldahl Nitrogen		Chlorides	Nitrogen as —		Oxygen Consumed	Fats	B.O.D.
		Albuminoid									
	Free	Total	In Solution	Total	In Solution		Nitrates	Nitrites			
Unsettled Wool-Scourings											
–	130.	200.	110.	420.	–	500	–	–	1900.	7200	6300
Settled Wool-Scourings											
–	140.	140.	–	300.	–	500	–	–	1500.	6000	5200
Lawrence Sewage applied to Sand Filter No. 591 (no wool-scourings added)											
–	29.0	6.40	3.90	12.	6.7	47	–	–	38.	33	284
Effluent from Sand Filter No. 591 (no wool-scourings added to applied sewage)											
8	.080	.178	–	–	–	46	25.0	.011	1.7	–	–
Lawrence Sewage and Wool-Scourings (1.0%) applied to Sand Filter No. 637											
–	30.0	7.60	4.80	14.	9.0	49	–	–	55.	90	340
Effluent from Sand Filter No. 637 (1.0% wool-scourings added to applied sewage)											
20	.374	.390	–	–	–	51	27.0	.016	4.4	–	–
Effluent from Trickling Filter No. 571 (no wool-scourings added to applied sewage)											
64	10.0	4.10	1.60	7.3	3.1	47	13.0	.370	22.	–	51
Effluent from Trickling Filter No. 638 (1.0% wool-scourings added to applied sewage)											
82	7.80	4.00	1.90	7.7	3.6	46	13.0	.560	23.	–	44

Character of the Sewage used in the Investigations of Sewage Purification at the Lawrence Experiment Station

The sewage for the various filters is pumped from the Osgood Street sewer to the Experiment Station through about 1,850 feet of pipe. It is a fairly strong domestic sewage free from trade wastes, with the coarser suspended matter excluded by a strainer on the end of the pipe in the sewer.

The following tables present the average analyses of sewage used during the year 1935. "Regular sewage" is the sewage as pumped to the Station; "settled sewage" is the same sewage after passing through Imhoff Tank No. 545 and receiving some additional settling in a large tank used for supplying all the filters at the Station, except Nos. 1, 4, 9A and 639, which receive the effluent of Imhoff

Tank No. 545. In this additional settling, 150 pounds of suspended solids per million gallons were removed.

IMHOFF TANK

One Imhoff Tank was operated during the year. It is of concrete, 20 feet deep, with a settling compartment 7 feet 4 inches long by 1 foot wide and has gas vents 1 foot square at each end. The bottom of the settling compartment has a slope of 45 degrees toward the center where there is a slot opening. The digestion compartment has a capacity of 357 gallons while the settling compartment has a capacity of 715 gallons, giving a theoretical storage of about one and one-half hours during the seven to eight hours a day that the sewage is being pumped. Settleable solids were removed during the year at the rate of 375 pounds of dry matter per million gallons of sewage. The digested sludge as drawn was usually entirely inoffensive, black in color, contained an average of 5.4 per cent dry matter and had a pH of around 7.0. The average composition of the dry sludge was,— fats, 12.8 per cent; nitrogen, 4.27 per cent; loss on ignition, 63 per cent. One hundred and eight pounds of dry matter, including some from the gas vents, were withdrawn and 390 pounds were added. This tank would undoubtedly digest a larger amount of fresh solids if they were available. The tank has given no trouble during the year from foaming or acid conditions.

Average Analyses
(Parts per Million)

AMMONIA			KJELDAHL NITROGEN					
	ALBUMINOID							
Free	Total	In Solution	Total	In Solution	Chlorides	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter 4 Days—20°C.
1935								
Regular Sewage								
28.9	10.3	5.41	19.	9.8	56	62	63	2,730,000
Sewage after passing through Imhoff Tank No. 545								
30.5	7.70	4.50	14.	8.4	55	49	44	2,130,000
Settled Sewage								
31.7	6.64	3.97	12.	7.1	53	41	40	1,920,000
1931–1935, Inclusive								
Regular Sewage								
39.8	10.0	6.06	18.	11.	70	60	53	2,594,000
Sewage after passing through Imhoff Tank No. 545								
41.2	7.44	4.92	13.	8.9	64	43	38	1,958,000
Settled Sewage								
41.2	6.36	4.10	11.	7.5	63	37	32	1,812,000

Average Solids
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
1935								
Regular Sewage								
580	343	237	408	206	202	172	137	35
Sewage after passing through Imhoff Tank No. 545								
513	280	233	386	185	201	127	95	32
Settled Sewage								
485	266	219	376	186	190	109	80	29

1931–1935, Inclusive								
Regular Sewage								
612	352	260	448	232	216	164	120	44
Sewage after passing through Imhoff Tank No. 545								
512	268	244	411	200	211	101	68	33
Settled Sewage								
482	249	233	394	185	209	88	64	24

OPERATION OF HOUSEHOLD SEPTIC TANKS

Two small concrete septic tanks, Nos. 507 and 508, have been operated at the Experiment Station since June, 1920. Tank No. 507 is 4 feet long, 2 feet wide and 40 inches deep, with a sloping bottom and has a capacity of 185 gallons. Tank No. 508 contains two compartments of the same size as the first and has a capacity of 370 gallons. Sewage enters each tank through trapped inlets and discharges through a pipe reaching 15 inches below the surface of the sewage in the tank. A baffle, located one-third of the distance from the inlet to the outlet, reaches to within 8 inches of the bottom of the tank. Tank No. 507 receives practically fresh household sewage and Tank No. 508 receives Lawrence sewage, which is comparatively stale. Both tanks are so operated that theoretically the sewage is held within each for two days; that is, the amount of sewage added daily is equal to one-half the capacity of the tanks, disregarding the effect of the accumulated sludge. During a large part of the period of operation, the effluents from both tanks have been remarkably clear and comparatively odorless. Besides settling out suspended solids, these tanks have effected a considerable reduction of soluble albuminoid ammonia. During 1935 the tanks were not opened for sludge measurements.

Average Analyses

(Parts per Million)

AMMONIA			KJELDAHL NITROGEN					
	ALBUMINOID							Bacteria per Cubic Centimeter 4 Days—20°C.
Free	Total	In Solution	Total	In Solution	Chlorides	Oxygen Consumed	Fats	
1935								
Fresh Sewage applied to Closed Septic Tank No. 507								
114.	23.4	11.8	41.	20.	85	109	123	1,700,000
Effluent from Closed Septic Tank No. 507								
99.1	8.37	5.49	15.	9.4	89	56	44	1,675,000
Regular Sewage applied to Closed Septic Tank No. 508								
41.1	10.0	5.97	18.	10.	62	61	63	2,000,000
Effluent from Closed Septic Tank No. 508								
44.4	4.03	2.45	7.2	4.4	60	27	25	1,800,000
1931–1935, Inclusive								
Fresh Sewage applied to Closed Septic Tank No. 507								
107.	21.1	10.6	37.	19.	87	104	132	3,720,000
Effluent from Closed Septic Tank No. 507								
93.1	7.75	4.92	14.	8.8	81	47	31	1,314,000
Regular Sewage applied to Closed Septic Tank No. 508								
45.4	10.0	6.23	18.	13.	69	56	54	1,735,000
Effluent from Closed Septic Tank No. 508								
48.7	3.80	2.59	6.9	4.6	68	25	23	1,451,000

Average Solids
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
1935								
Fresh Sewage applied to Closed Septic Tank No. 507								
924	632	292	549	293	256	375	339	36
Effluent from Closed Septic Tank No. 507								
579	312	267	434	197	237	145	115	30
Regular Sewage applied to Closed Septic Tank No. 508								
592	347	245	404	205	199	188	142	46
Effluent from Closed Septic Tank No. 508								
424	203	221	372	170	202	52	33	19
1931–1935, Inclusive								
Fresh Sewage applied to Closed Septic Tank No. 507								
907	601	306	514	273	241	393	328	65
Effluent from Closed Septic Tank No. 507								
532	246	286	430	171	259	102	75	27
Regular Sewage applied to Closed Septic Tank No. 508								
595	322	273	422	197	225	173	125	48
Effluent from Closed Septic Tank No. 508								
407	166	241	351	130	221	56	36	20

ACTIVATED SLUDGE

Experiments on the aeration of sewage have been carried on at the Lawrence Experiment Station continuously since 1911, and descriptions and results of this work have been published in the annual reports of the Department. Activated sludge Tank No. 485, which was started in 1917, is still in operation and has three compartments 75 inches deep, each holding 230 gallons. The overflow from the last compartment, comprising the purified sewage and considerable sludge, passes through two settling tanks with capacities of 600 and 160 gallons, respectively, allowing about three and three-quarters hours' sedimentation during which time the activated sludge settles out and is then pumped back to the first compartment. The retention of sewage in the aerating compartments is about three and one-half hours. Air is applied at the bottom of each compartment through a filtros plate, clamped to the top of an iron box, at a rate approximating .33 cubic feet of air per hour per gallon of sewage treated. The amount of sludge retained in the tank was considerably less than the 20 per cent by volume formerly used. Excess sludge, equivalent to 162 pounds per million gallons of sewage treated, was pumped to waste. This sludge contained, on a dry basis, 6.5 per cent nitrogen and 6.5 per cent fats. The mixture of sludge and aerated sewage entering the settling tank contained an average of 6.1 parts per million dissolved oxygen. The final effluent from the settling tanks has been usually clear and bright, with an average of 27 parts per million suspended solids.

Tank No. 590, aerated by mechanical agitation, was discontinued after four years' operation.

Average Analyses
(Parts per Million)

APPEARANCE		AMMONIA			KJELDAHL NITROGEN		Chlorides	NITROGEN AS —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days—20°C.
			ALBUMINOID								
Turbidity	Color	Free	Total	In Solution	Total	In Solution		Nitrates	Nitrites		
1935											
Sewage applied to Activated Sludge Tank No. 485											
–	–	30.6	6.90	4.06	13.	7.4	52	–	–	44	1,920,000
Effluent from Activated Sludge Tank No. 485											
3	49	13.4	2.06	1.58	3.8	2.9	54	6.78	.78	13	275,000
1931–1935, Inclusive											
Sewage applied to Activated Sludge Tank No. 485											
–	–	41.1	7.50	4.38	13.	8.0	65	–	–	42	1,812,000
Effluent from Activated Sludge Tank No. 485											
3	48	15.2	1.90	1.32	3.5	2.4	62	10.9	.611	13	302,000

Average Solids
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
1935								
Sewage applied to Activated Sludge Tank No. 485								
481	272	209	367	182	185	114	90	24
Effluent from Activated Sludge Tank No. 485								
312	141	171	285	124	161	27	17	10
1931–1935, Inclusive								
Sewage applied to Activated Sludge Tank No. 485								
505	264	241	379	173	206	126	91	35
Effluent from Activated Sludge Tank No. 485								
362	139	223	340	124	216	22	15	7

INTERMITTENT SAND FILTERS

Intermittent filtration of sewage through sand is the earliest form of sewage purification along scientific lines. Broad irrigation, while used earlier, did not have as its primary object the purification of sewage. The first intermittent filter at the Lawrence Experiment Station was started in 1887, and since then two hundred and twelve have been operated with sewage in addition to many others operated with various kinds of trade wastes. The earliest experiments at Lawrence showed that the successful operation of these filters depended on the materials and methods of operation being such that there was always a supply of oxygen in the interstices of the sand. Factors unfavorable to the proper operation of these filters are (1) sand that is too fine, (2) excessive amounts of organic matter in the upper portion of the sand, and (3) failure to provide a free outlet for the effluent.

Studies of Overdosing

The correct method of operating an intermittent sand filter is to apply sewage every day in one dose as rapidly as possible so as to cover the whole surface of the filter uniformly. If the sewage is applied slowly at one or more points on the bed, the entire surface will not be covered, some of the air in the sand will not be changed and those sections of the bed receiving the sewage will be operating as continuous instead of intermittent filters, all of which make for poor results.

The filter area, every unit of which receives sewage every day, is the exception rather than the rule. It is unfortunately the practice at many treatment works, for a number of reasons, to apply during a few hours an amount of sewage equivalent to what should be applied in a number of days.

To show the effect of this improper method of flooding filters, a series of small filters, containing 4 feet in depth of sand, has been operated at the Experiment Station. Filter No. 593 is operated as a control and flooded once daily; Filter No. 594 is flooded every two days; Filter No. 595, every three days; Filter 596, every four days; Filter No. 597, every five days; Filter No. 598, every six days; Filter No. 599, every seven days; but each filter receives an equal volume of sewage each week unless its surface becomes clogged. Filter No. 600 is a duplicate of Filter No. 593, except that 25 per cent of the material consists of stone between 1 and 2 inches in diameter.

During 1934 the intended rate of operation of these filters was 63,700 gallons per acre daily and the difference in the results of the operation of the various filters was not as great as expected at this rate. During 1935 the rate was increased to 101,300 gallons per acre daily and this higher rate resulted in an increase in the free ammonia and a somewhat lower albuminoid ammonia and nitrates in the effluents. The most noticeable result was the longer time that Filter No. 599, flooded every seventh day, was covered with sewage. As long as sewage remained on the surface of any of the filters no additional sewage was applied and for 50 per cent of the time no sewage was applied to Filter No. 599, which resulted in the average rate being reduced to 49,600 gallons per acre daily. In spite of the clogging, this filter gave the highest nitrates, due partly to the fact that the average rate was only half that of most of the other filters.

The sand of these filters had an effective size of .25 millimeter and a uniformity coefficient of 3.1, a very favorable size for sewage purification. Most of the filtration areas of the State are of material found in place; and this is very seldom of satisfactory quality, the effective size being usually too low and the uniformity coefficient too high.

A rough, weighted average of available sand analyses from municipal areas gave an effective size of .15 millimeter and a uniformity coefficient of 5.6. A synthetic mixture of sands of this effective size and uniformity coefficient was made up and a series of filters, Nos. 643 to 649, inclusive, containing 4 feet in depth of this sand, was started June 13, 1935, and operated exactly the same as the series of Filters Nos. 593 to 599, inclusive. Filters Nos. 643 to 649, inclusive, show more clearly the progressively poorer purification as the interval between floodings is increased. The average bacterial analyses of both series of filters are irregular, partly due to an insufficient number of samples, and show no regular trend.

Effect of a Water-Seal at the Outlet of a Filter and of Dirty Sand

A small filter, No. 624, started December 11, 1933, containing 3½ feet in depth of sand of an effective size of .25 millimeter, was provided with a trapped outlet so that the lower seven inches of the filter was always filled with liquid. It received settled sewage at a rate of 50,000 gallons per acre daily. As the upper portion of sand was relatively clean and of a suitable size, the applied sewage had no difficulty in forcing enough air to the surface to maintain aerobic conditions within the filter. This shows that a filter can be operated successfully even though the lower section is continually water-sealed, provided the sand is of suitable size and the surface layer not overloaded with organic matter.

Another filter, No. 627, started March 28, 1934, shows what happens under similar conditions when the surface layer of sand is very dirty. This filter, trapped like Filter No. 624, contained 5 feet in depth of sand representing a cross section through Filter No. 1. This latter filter had been in operation forty-seven years and the upper foot of sand was quite dirty, containing an average of 705 parts per million of albuminoid ammonia. The sand below this depth was comparatively clean. Filter No. 624 gave a good effluent at all times while Filter No. 627, due to clogging, was able to operate only 77 per cent of the time and at the end of the year was completely clogged. The effluent was of poor quality.

Two more filters, started in January, 1934, were operated to show the effect of an accumulation of organic matter in the upper portion of a filter on the ordinary operation of the filter. Filter No. 625 contained 5 feet in depth of clean sand taken from Filter No. 1 below the upper foot of dirty sand. Filter No. 626, like Filter No. 627, contained 5 feet in depth of sand representing a cross section of Filter No. 1. The rate of operation of Filter No. 625 was 50,000 gallons per acre daily. Filter No. 626, due to clogging, was able to operate at a rate of only 37,500 gallons per acre daily but even at this lower rate the effluent was of much poorer quality than that of the filter with clean sand.

Filters Nos. 1, 4, 9A and 639

Filters Nos. 1, 4, and 9A are each 1/200 of an acre in area, and at the end of 1935, Filter No. 1 and Filter No. 4 had been operated forty-eight years and Filter No. 9A, forty-five years. For the past ten years, the sewage applied to these filters has passed through an Imhoff tank where some suspended solids have been removed. These three filters contain 5 feet in depth of sand of an effective size of .48, .04 and .17 millimeter, respectively, and during the year were operated at average rates of 49,000, 19,900 and 49,500 gallons per acre daily, respectively. The surfaces of Filters Nos. 1 and 9A are trenched and ridged late in the fall, while the surface of Filter No. 4 is permanently arranged in circular trenches, 14 inches wide, filled to a depth of 12 inches with coarse sand of an effective size of .48 millimeter. Sewage is applied to the trenches while grass is allowed to grow on the rest of the filter.

Filter No. 1 has not given as good purification during the last two or three years as formerly. The operation of the two small filters, No. 625 with all clean sand, and No. 626 with 4 feet of clean sand and 1 foot of dirty sand from Filter No. 1, indicated that Filter No. 1 would give better results if the upper foot of dirty sand were removed. This was done, the area being reduced and the clean sand from the abandoned portion being used to replace the dirty sand. This did not result in the expected improvement. The appearance of the effluent seems to indicate that some sewage was being short-circuited to the underdrains. The sand of this filter rests in a cypress tank sunk in the ground. Sand is banked against the edges of the tank so no sewage reaches the edge of the tank near the surface. The wood of the tank is rather rotten from its forty-eight years in the ground and it is possible that some sewage meeting this porous wood at some distance below the surface may pass directly to the underdrains with only partial purification. It is doubtful whether it is worth while to replace the wooden tank with concrete.

There has been considerable interest during recent years in processes that give a lower degree of purification than was formerly considered necessary. This has been an important consideration because where sand filters are constructed of sand brought from a distance, the depth of sand required to give the desired purification may make the cost prohibitive. The usual depth of sand used in filters is 3 1/3 to 5 feet and in order to ascertain the efficiency of filtering through sand of less depth it was thought worth while to operate a filter with only 2 feet of sand. In this connection the sand was removed from old Filter No. 5 which was contained in a wooden tank similar to Filter No. 1. The wooden bottom was replaced with concrete and the wooden sides plastered over with cement. Six inches of underdrains of graded stone and gravel were put in, and over this, 2 feet of sand of an effective size of .22 millimeter. This filter was started May 1 and renumbered 639. The effluent has averaged 12.3 parts per million nitrates but has been very turbid. The filter has not been operated through a winter as yet but it seems likely that this shallow filter will be more adversely affected by winter weather than the deeper filters, Nos. 1, 4 and 9A.

Depth of Intermittent Sand Filters

With all the intermittent sand filters that have been operated at the Experiment Station, there has been no direct comparison of the effectiveness of filters of different depths. There is no uniformity in the depth of sand of municipal and institution filtration areas. Where the existing soil is merely underdrained, the depth is not of much importance from a cost point of view; but where the sand has to be brought from a distance, the depth is an important consideration.

With this point in view, five filters have been operated during the year at the Experiment Station at a rate of about 76,800 gallons per acre daily. They are Nos. 636, 620, 621, 622 and 623 and contain 1, 2, 3, 4 and 5 feet in depth, respectively, of sand of an effective size of .25 millimeter. Nitrification is nearly the same in all except the shallowest, No. 636. The amount of organic matter is somewhat lower in the effluents from the two deeper filters. If the 2-foot filter can maintain the same degree of purification over a period of years, it would indicate that this depth of sand would be sufficient in many places where effluents are discharged into relatively polluted streams. The effluent from the 1-foot filter is much poorer than that from the 2-foot filter but still shows a remarkable amount of purification considering the depth of sand.

Average Analyses of Effluents
(Parts per Million)

Filter Number	Quantity Applied	Temperature (Deg. F.)		Ammonia		Chlorides	Nitrogen as —		Oxygen Consumed	Alkalinity
	Gallons per Acre Daily	Applied	Effluent	Free	Albuminoid		Nitrates	Nitrites		
					1935					
1	49,000	56	53	6.75	1.52	46	19.0	.188	11.	6
4	19,900	56	53	1.78	.285	47	22.2	.055	3.7	−7
9A	49,500	56	55	2.40	.357	36	18.8	.077	3.7	−6
639	–	–	–	4.08	1.90	40	12.3	.922	17.	42
					1931–1935, Inclusive					
1	46,600	56	53	6.83	.982	56	26.1	.250	7.8	6
4	19,400	55	53	.84	.257	55	28.8	.041	3.4	−7
9A	47,800	56	54	2.41	.383	47	24.2	.023	4.7	1

Average Analyses of Effluents
(Parts per Million)

Filter Number	Number of Days Between Floodings	Color	Ammonia		Chlorides	Nitrogen as —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
593	1	12	1.09	.303	51	29.6	.07	3.7
594	2	26	1.00	.474	51	29.9	.36	5.4
595	3	32	1.45	.618	52	17.1	.55	7.3
596	4	25	1.64	.601	53	11.2	.49	5.9
597	5	21	1.22	.484	50	22.8	.50	5.2
598	6	25	.94	.685	49	15.7	.43	6.5
599	7	37	2.29	.565	54	46.6	.10	4.6
600	1	35	3.16	.508	52	22.9	.65	5.8
643	1	15	.093	.267	50	25.7	.49	3.5
644	2	15	.095	.324	51	18.6	.31	4.4
645	3	23	.082	.423	51	5.4	.55	5.3
646	4	22	1.77	.522	50	13.1	.22	4.9
647	5	49	9.18	.680	45	6.5	.42	8.1
648	6	44	12.7	.806	50	6.1	.10	8.3
649	7	86	23.1	1.10	47	2.1	.12	12.3

Average Analyses of Effluents
(Parts per Million)

Filter Number	Depth (Feet)	Color	Ammonia		Chlorides	Nitrogen as —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
636	1	53	5.67	1.21	49	18.3	1.03	10.
620	2	25	.811	.650	50	28.3	.72	6.5
621	3	33	1.58	.454	50	29.4	.12	4.0
622	4	16	.285	.326	50	28.7	.51	4.4
623	5	11	.485	.229	50	27.4	.08	2.7

Average Analyses of Effluents

(Parts per Million)

FILTER NUMBER	AMMONIA		Chlorides	NITROGEN AS —		Oxygen Consumed
	Free	Albuminoid		Nitrates	Nitrites	
624 (clean sand, trapped)	.261	.196	53	23.3	.05	1.8
627 (dirty sand, trapped)	14.5	1.71	53	9.8	.25	14.
625 (clean sand)	.156	.350	54	35.5	.28	3.8
626 (dirty sand)	2.73	1.56	55	16.8	.48	18.

Average Bacterial Analyses of Effluents

FILTER NUMBER	BACTERIA PER CUBIC CENTIMETER			Coli-Aerogenes Group in 100 cc.
	4 DAYS 20°C.	24 Hours—37°C.		
		Total	Red	
1	543,000	16,100	11,900	385,000
4	13,800	290	83	1,900
9A	37,900	1,080	430	18,900
639	130,000	25,000	15,000	1,000,000
593	1,570	200	30	2,600
594	75,900	610	200	2,600
595	67,200	1,230	160	2,800
596	54,300	1,160	520	25,300
597	46,800	770	480	25,100
598	121,000	460	180	3,000
599	41,300	2,100	390	25,300
600	19,400	260	88	3,000
636	380,000	7,600	6,100	78,000
620	36,500	2,100	500	30,300
621	22,500	180	11	325
622	3,400	150	63	2,800
623	2,630	8	1	55
625	17,600	135	3	1,000
626	88,600	120	8	1,000
627	76,000	4,100	7	4,000
643	27,000	1,600	700	1,000
644	7,000	290	240	10,000
645	11,000	100	20	100
646	75,000	120	75	5,500
647	90,000	140	110	10,000
648	70,000	80	20	100
649	6,500	35	6	100

Rates of Operation of Sand Filters

FILTER NUMBER	RATE	Per Cent of Time Filter was Covered with Sewage
	Gallons per Acre Daily	
593	101,300	0
594	97,600	3
595	101,300	0
596	98,500	2
597	66,700	33
598	101,300	0
599	49,600	52
600	89,800	12
636	76,800	0
620	76,800	0
621	70,900	8
622	76,800	0
623	68,600	10
643	105,600	0
644	105,600	0
645	92,900	12
646	105,600	0
647	95,000	10
648	88,700	16
649	82,400	23

TRICKLING FILTERS

In 1890, an intermittent filter of coarse gravel was operated at the Experiment Station. This was the forerunner of the present trickling filter, and was probably the first filter of this type anywhere. Since then, there always has been a number of these filters in operation at the Experiment Station for the study of various problems in connection with their use.

The longest in use, No. 135, has been in operation thirty-six years and is constructed of 10 feet in depth of walnut-size crushed stone. This size stone has been found to be rather small for practical use. While this filter has given a very good effluent, there has been a tendency toward clogging of the upper portion.

Four other filters, Nos. 452 to 455, inclusive, contain 4, 6, 8 and 10 feet in depth, respectively, of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. These filters were operated to show the greater efficiency of deeper filters, and their effluents have been of approximately the same quality. For each foot in depth of material, they have filtered 199,000, 248,000, 373,000 and 397,000 gallons of sewage per acre daily, respectively. Filter No. 475 contains 10 feet in depth of stone passing a 2½-inch screen and retained by a 1½-inch screen.

Filters Nos. 571, 572 and 573 are identical in construction, being 1/20,000 of an acre in area and containing 10 feet in depth of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. During 1935, the average rate of operation was 1,440,000 gallons per acre daily. At depths of 4, 6 and 8 feet, half-round sections of ¾-inch iron pipe are inserted to the center of the filters to collect small portions of the liquid passing through the filter. During 1935, samples were collected at different depths from Filter No. 571 only. The results of the analyses show progressive purification down through the filter.

The three filters, Nos. 571, 572 and 573 have been operated mainly to study the value of chlorination and aeration as preliminary treatments of the sewage applied to the filters. Filter No. 571 was used as a control. The sewage applied to No. 572 received 15 parts per million available chlorine from hypochlorite, and was allowed to stand until the chlorine was used up before being applied to the filter. The sewage applied to Filter No. 573 was stored in a conical bottom tank, and a jet of air was blown through the sewage continuously giving an average dissolved oxygen content of 6.5 parts per million. Sludge was drained from this tank daily so there was very little, if any, clarification due to an activated sludge effect. This year, 1935, was the fourth year during which hypochlorite was added to the sewage applied to Filter No. 572. During the first three years, 10 parts per million available chlorine was added and during 1935 this was increased to 15 parts per million. There has been little difference in the quality of the effluents of the three filters during 1935. Filter No. 573, receiving aerated sewage, had the highest nitrates and the lowest soluble albuminoid ammonia. Filter No. 572, receiving the hypochlorite, had the lowest number of bacteria but this was of no practical significance. Its nitrates were higher than in the control Filter No. 571 but the oxygen consumed and soluble albuminoid ammonia also were higher. Chlorination of the sewage applied to Filter No. 572 was discontinued after four years with the conclusion that it was of no value as a preliminary treatment.

Average Analyses
Effluents from Trickling Filters
(Parts per Million)

FILTER NUMBER	Quantity Applied	AMMONIA			Kjeldahl Nitrogen	Chlorides	NITROGEN AS —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days—20°C.
			ALBUMINOID							
	Gallons per Acre Daily	Free	Total	In Solution			Nitrates	Nitrites		
				1935						
135	1,489,000	9.20	4.47	2.24	7.9	52	24.3	.39	28	1,100,000
452	795,000	8.80	3.83	1.95	6.9	52	16.9	.28	21	390,000
453	1,489,000	11.5	3.55	1.89	6.4	52	12.3	.49	19	270,000
454	2,980,000	14.5	3.63	1.96	7.0	52	10.0	.38	20	487,000
455	3,973,000	8.41	4.28	2.10	7.8	53	31.5	.13	25	280,000
475	2,980,000	12.3	5.35	2.90	9.7	53	19.5	.26	26	610,000

1931–1935, Inclusive

135	1,436,000	13.2	3.64	1.96	6.4	65	20.7	.289	26	472,000
452	861,000	17.4	5.02	2.84	8.7	64	15.3	.374	28	359,000
453	1,155,000	19.9	3.98	2.34	7.0	65	11.6	.444	23	281,000
454	2,388,000	18.5	3.60	2.08	6.7	64	13.4	.484	22	460,000
455	3,839,000	15.8	3.86	2.10	7.0	63	17.2	.353	24	317,000
475	2,812,000	18.1	4.52	2.48	7.9	63	14.1	.511	25	563,000

Average Solids
Effluents from Trickling Filters
(Parts per Million)

Filter Number	Unfiltered			Filtered			In Suspension		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
1935									
135	517	248	269	418	193	225	99	55	44
452	525	251	274	415	185	230	110	66	44
453	455	197	258	377	151	226	78	46	32
454	445	201	244	373	155	218	72	46	26
455	472	222	250	386	168	218	86	54	32
475	478	217	261	384	160	224	94	57	37
571*	540	274	266	431	209	222	109	65	44
572	608	305	303	450	220	230	158	85	73
573	525	260	265	415	203	212	110	57	53
1931–1935, Inclusive									
135	601	312	289	419	204	215	182	108	74
452	490	242	248	393	175	218	97	67	30
453	435	204	231	360	164	196	75	40	35
454	455	225	230	344	147	197	111	78	33
455	534	284	250	431	209	222	103	75	28
475	529	277	252	416	210	206	113	67	46
571*	560	318	242	450	253	197	110	65	45
572	688	386	302	470	272	198	218	114	104
573	510	260	250	387	202	185	123	58	65

* 10-foot effluent.

Average Analyses of Effluents from Trickling Filters collected at Different Depths
(Parts per Million)

Depth (Feet)	Ammonia			Kjeldahl Nitrogen	Chlorides	Nitrogen as —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days—20°C.
	Free	Albuminoid				Nitrates	Nitrites		
		Total	In Solution						
1935									
Filter No. 571									
4	20.3	5.67	3.15	11.	51	5.24	.45	27	2,100,000
6	17.6	6.00	2.74	11.	50	12.4	.42	30	1,153,000
8	13.2	4.68	2.32	8.7	50	20.0	.28	27	1,090,000
10	14.1	4.98	2.14	9.0	50	22.9	.27	27	990,000
Filter No. 572									
10	8.22	7.30	2.34	13.	70	24.2	.32	39	445,000
Filter No. 573									
10	13.	4.80	2.09	8.7	51	24.7	.40	27	1,035,000
1931–1935, Inclusive									
Filter No. 571									
4	29.3	5.40	3.40	10.	67	6.80	.423	32	1,370,000
6	24.4	5.36	2.88	9.7	66	11.3	.452	32	809,000
8	20.7	4.76	2.38	8.6	66	18.5	.333	29	680,000
10	19.6	4.80	2.18	8.8	65	21.8	.331	29	535,000
Filter No. 572									
10	17.6	5.34	2.26	10.	80	21.2	.308	31	508,000
Filter No. 573									
10	16.9	4.58	2.02	8.4	67	24.8	.331	28	696,000

Trickling Filters Operated at Very High Rates

In the operation of sewage filters of all types, it has been the general practice to get as much purification and nitrification as practicable. There is, however, a growing tendency toward the development of processes of partial purification to meet special cases where more complete purification is not needed. Some investigators are turning to studies of the operation of trickling filters at high rates. In one instance, 20 per cent or more of such an effluent is refiltered along with the newly applied sewage as it is claimed that this increases the net purification.

Up to the year 1935 the highest rate at which a trickling filter had been operated at the Lawrence Experiment Station was about 10,000,000 gallons per acre daily. The sewage applied to this filter had been well clarified and somewhat purified by aeration in a slate tank; this effluent was well nitrified and stable.

In May, the operation of a trickling filter, No. 640, 6 inches in diameter and containing 10 feet in depth of crushed stone passing a 1½-inch screen and retained on a ¾-inch screen, was started at a rate of 2,200,000 gallons per acre daily which was gradually increased to 17,800,000 by August 1. Twenty per cent of the effluent was refiltered. The sewage and effluent were stored in separate tanks and applied to the filter separately but at the same time. By August 15 the filter became clogged and the upper foot of stone was removed, washed, and replaced; by October 15 it again became clogged and all the material was then removed and replaced with crushed stone passing a 2½-inch screen and retained by a 1½-inch screen.

Apparently the clogging was caused by the deposit on the stones being in the nature of a sewage slime which did not slough off as is the case of coatings on the stone of a normally operated trickling filter. Since the increase in the size of the stone no further clogging has been apparent. The effluent appears more like slightly clarified sewage than a trickling filter effluent.

On October 25 a duplicate of Filter No. 640 was placed in use. Operation of this filter, No. 650, was started at a rate of 17,800,000 gallons per acre daily. It was operated in the same manner as Filter No. 640, except that no effluent was refiltered. For the last two months of the year the sewage applied to these two filters had a B.O.D. of 341 parts per million and the B.O.D. of the effluent of the two filters was 93 and 103, a reduction of 73 and 70 per cent, respectively. For the longer period of operation of Filter No. 640 (August 1 to December 31), the per cent B.O.D. reduction was 65. These two filters have not been operated long enough in parallel to determine the value of refiltering a portion of the effluent but so far the value has not been great.

In considering the purification of sewage by such filters as these, or by any other process which aims at partial purification, too much reliance should not be placed on the reduction of B.O.D. alone. These two effluents had only about 30 per cent of the B.O.D. of the applied sewage, yet their relative stabilities were frequently less than 11. This means that septic action would set in within twenty-four hours. In 1932, the average B.O.D. of the effluents of eleven trickling filters at the Experiment Station was 46, a reduction of 81 per cent. The relative stability of the effluents was 99. These results are not directly comparable with those of Filters No. 640 and 650 but it is significant that a reduction of 70 per cent in one case leaves an effluent which is little more than clarified sewage while a reduction of only 11 per cent more, or 81 per cent, leaves a perfectly stable effluent with the suspended matters thoroughly worked over by bacterial action.

Average Analyses of Effluents from Trickling Filters operated at Very High Rates
(Parts per Million)

Filter Number	Ammonia			Kjeldahl Nitrogen		Chlorides	Nitrogen as —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days—20°C.
		Albuminoid								
	Free	Total	In Solution	Total	In Solution		Nitrates	Nitrites		
640	22.5	4.20	2.90	7.5	5.3	53	.784	.080	24	2,600,000
650	17.8	5.07	3.29	9.4	6.1	52	.536	.057	27	3,150,000

OPERATION OF CONTACT FILTERS

Although contact filters are practically obsolete, one filter of this type, No. 175, is kept in operation as an example of this method of sewage purification. Probably the principal reason for the abandonment of the contact filter is the fact that unlike the trickling filter, it is not self-cleansing. The material of the filter eventually becomes clogged with suspended matters which in the trickling filter are discharged when the accumulation reaches a certain point. Further, the rate depends on the open space and this decreases with operation. Practicable rates of operation are much lower than with trickling filters.

Filter No. 175 was put in operation in 1901 and contains 39 inches in depth of coke passing a 1-inch screen and retained on a ¼-inch screen. During 1935 it was operated one five-hour cycle daily at a rate of 356,000 gallons per acre daily with sewage which had passed through an Imhoff tank and received a small amount of settling in a storage supply tank. It was allowed to rest one week six times during the year. Since 1901, it has been necessary to remove and wash the filtering material three times,—in 1911, in 1920, and in 1934. The loss of open space during the year was 5 per cent.

Average Analyses
Effluent from Contact Filter No. 175
(Parts per Million)

QUANTITY APPLIED	AMMONIA					NITROGEN AS —			
		ALBUMINOID							
Gallons per Acre Daily	Free	Total	In Solution	Kjeldahl Nitrogen	Chlorides	Nitrates	Nitrites	Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days—20°C.
				1935					
356,000	13.4	3.47	2.27	6.2	55	2.50	.12	20	1,700,000
				1931–1935, Inclusive					
311,000	9.66	3.00	1.94	5.4	63	10.2	.356	19	751,000

Average Solids
Effluent from Contact Filter No. 175
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
				1935				
366	135	231	298	106	192	68	29	39
				1931–1935, Inclusive				
408	180	228	358	153	205	50	27	23

BIOCHEMICAL OXYGEN DEMAND OF RIVER WATER

The B.O.D. and dissolved oxygen of the Merrimack River were determined monthly from June to November, inclusive, at the same stations as during the six previous years. There is a slight variation in the condition of the river from year to year as shown by the B.O.D. determinations but the results follow the same general trend.

STATION	B.O.D. (Parts per Million)	Dissolved Oxygen Per Cent of Saturation
	1935	
At Tyngsborough	1.5	74.1
Above Lowell	1.8	74.5
Below Lowell	2.5	74.1
Above Lawrence	1.7	59.1
Below Lawrence	20.0	59.2
Above Haverhill	4.9	72.1
At Groveland	6.3	54.5
Above Amesbury	4.0	58.7
Above Newburyport	4.5	53.0
	1931–1935, Inclusive	
At Tyngsborough	1.9	75.0
Above Lowell	2.5	76.7
Below Lowell	2.9	76.3
Above Lawrence	2.4	69.7
Below Lawrence	17.2	65.6
Above Haverhill	5.9	71.5
At Groveland	6.2	54.0
Above Amesbury	4.4	65.1
Above Newburyport	4.3	58.3

PURIFICATION OF POLLUTED WATER BY STORAGE

The study of the effect of storage in the purification of water, begun in 1930, has been continued. Two covered concrete tanks, 16 feet in diameter and holding 3 feet 9 inches in depth of water, are used. A small door in each tank allows diffused light to enter during the warmer months but during the winter the doors are closed. The first tank is divided by concrete walls into three sectors, one about as large as the other two. The second tank is divided into four equal sectors. These seven compartments are connected in series, the inlet in each case being at the bottom and the outlet near the top. Merrimack River water is passed continuously into the first compartment at such a rate that it is thirty days passing through the two tanks. There has been practically no color reduction resulting from this period of storage, the average color for the past five years of the river water entering the tank being 43 parts per million, and the color after storage, 41. This is probably due to the absence of direct sunlight. Bacteria of the coli-aerogenes group were reduced 98.95 per cent, and of the 20°C. bacteria, 99.22 per cent was removed. Storage also removed practically all suspended matter and reduced the free, total and soluble albuminoid ammonia.

A sand filter, No. 577, was operated at a rate of 2,500,000 gallons per acre daily with the stored water, and a duplicate filter, No. 576, was operated with river water such as entered the storage tank. Both of these filters contain 4 feet in depth of sand of an effective size of .25 millimeter. The low bacterial efficiency of the filter receiving the stored water is typical of the results when a water free from suspended or easily coagulable matter is filtered through a slow sand filter.

Average Chemical Analyses
(Parts per Million)

		AMMONIA				NITROGEN AS —			
			ALBUMINOID						
	Color	Free	Total	In Solution	Chlorides	Nitrates	Nitrites	Oxygen Consumed	Hardness
				1935					
Filter No. 576:									
Raw river water applied to	42	.132	.185	.151	4.1	.234	.006	5.4	12
Effluent from	28	.025	.109	–	4.1	.297	.004	4.1	12
Filter No. 577:									
Stored river water applied to	43	.028	.151	.129	3.5	.306	.006	4.7	22*
Effluent from	37	.019	.114	–	3.5	.312	.003	4.2	23*
				1931–1935, Inclusive					
Filter No. 576:									
Raw river water applied to	43	.185	.204	.164	4.3	.235	.008	5.1	14
Effluent from	28	.036	.107	–	4.3	.322	.006	3.7	14
Filter No. 577:									
Stored river water applied to	41	.045	.138	.123	3.8	.387	.005	4.3	33*
Effluent from	35	.021	.109	–	3.8	.417	.003	3.8	33*

* Increased hardness due to use of concrete storage tanks.

Average Bacterial Analyses

	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 c.c.
	4 Days 20°C.	24 Hrs.—37°C.		
		Total	Red	
1935				
River water before storage	2,300	170	63	2,200
River water after 30 days' storage	180	17	1	23
Effluent from Filter No. 576	130	12	3	57
Effluent from Filter No. 577	96	8	1	9
**1931–1935, Inclusive*				
River water before storage	2,700	160	53	2,500
River water after storage	216	11	0	9
Effluent from Filter No. 576	126	9	1	30
Effluent from Filter No. 577	109	8	0	4

* Storage periods: January—March, 1931, 25 days.
April, 1931—December, 1932, 45 days.
January, 1933—December, 1935, 30 days.

STERILIZATION OF WATER BY KATADYN SILVER

The Katadyn process is based on the fact that metallic silver has distinct germicidal properties when in contact with water for a sufficiently long time. Under the conditions of this process an amount of the metal, so small as to be detected with difficulty by ordinary analytical methods, goes into solution. This minute amount of metal has extraordinary properties but the actual mechanism of the sterilizing action is not definitely known and there is lack of agreement among different investigators as to the effect of dissolved oxygen and varying pH values of the water.

The action is much slower than that of chlorine and the water exposed to the Katadyn action has the property of acting on a limited quantity of other water added to it. The amount the original water can be diluted without destroying its usefulness depends on the initial concentration of silver ions in it. One of the earlier methods of utilizing this property was to pass water through a filter of sand coated with a thin deposit of silver; but for commercial purposes a more practical method is to pass an electric current between two electrodes of silver submerged in the water.

A small Electro Katadyn test set, having a maximum capacity of ten gallons per hour, was used in making some laboratory studies of the efficiency of the process. The set consists of two electrodes of sheet silver in a straight-sided funnel or carbon filter, so called. The top of the filter is closed with a stopper and delivery tube. The water to be treated passes upward between the electrodes at a controlled rate. Current is supplied by several 1.5 volt dry cells in parallel and measured by a milliammeter. It is necessary to reverse the direction of flow of the current at fifteen minute intervals to avoid the formation of electrode coatings of high resistance. Theoretically, one ampere hour should dissolve 4.0265 grams of silver but tests have shown that with this small set the efficiency is only 40 per cent and hence one milliampere hour dissolves 1.6 milligrams or 1,600 gamma of silver per hour. The activation degree is the number of gamma divided by the number of gallons treated per hour. Four runs were made at each of two different rates with the set, using Merrimack River water which had a pH of 6.5. The samples were allowed to stand before plating for the lengths of time shown in the following table. Tests were made also on water from a large indoor swimming pool, this water being clear and colorless, with a pH of 6.0.

The results show that with a badly polluted water at least two hours of activation are necessary and that twenty-four hours are preferable. The bactericidal action is selective to a certain extent. Members of the coli-aerogenes group and acid-forming bacteria growing at 37°C. were killed off to a greater extent than the non-acid-formers growing at 37°C. and the organisms growing at 20°C.

The swimming pool from which the water for these tests was taken is regularly dosed with hypochlorite. The hypochlorite treatment killed all the acid-formers and the more susceptible 20°C. bacteria but the remaining bacteria were quite resistant to the Katadyn treatment.

*Average Bacterial Analyses Showing Effect of Length of Activation—Merrimack River Water

Silver Added (Gamma)	Length of Activation	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 cc.
		4 Days 20°C.	24 Hours—37°C.		
			Total	Red	
	Water at start	17,900	520	290	10,000
530	15 minutes	1,420	120	23	100
	30 minutes	1,030	86	9	78
	60 minutes	510	38	2	10
	2 hours	225	37	1	6
	24 hours	130	22	0	2
	Water at start	15,200	490	250	8,500
800	15 minutes	930	110	12	100
	30 minutes	470	56	3	32
	60 minutes	230	49	0	6
	2 hours	150	26	0	3
	24 hours	105	52	0	1

* 4 Samples.

Bacterial Analyses Showing Effect of Degree and Length of Activation—Swimming Pool Water

Silver Added (Gamma)	Length of Activation	Bacteria per Cubic Centimeter			Coli-Aerogenes Group in 100 cc.
		4 Days 20°C.	24 Hours—37°C.		
			Total	Red	
	Water at start	460	4	0	0
530	15 minutes	450	4	0	0
	30 minutes	420	5	0	0
	60 minutes	320	3	0	0
	2 hours	350	6	0	0
	24 hours	130	1	0	0
	Water at start	240	8	0	0
760	15 minutes	700	12	0	0
	30 minutes	700	10	0	0
	60 minutes	540	8	0	0
	2 hours	750	6	0	0
	24 hours	90	3	0	0
	Water at start	460	4	0	0
800	15 minutes	290	1	0	0
	30 minutes	300	0	0	0
	60 minutes	290	0	0	0
	2 hours	280	0	0	0
	24 hours	540	1	0	0
	Water at start	240	8	0	0
1,120	15 minutes	100	4	0	0
	30 minutes	110	4	0	0
	60 minutes	95	5	0	0
	2 hours	95	2	0	0
	24 hours	160	0	0	0

TAKING UP OF IRON BY WATER DURING PASSAGE THROUGH CERTAIN MATERIALS

The action of distilled water on sands from Georgetown and Lawrence was discussed in the report for 1934 and this study was continued during 1935. Three filters, Nos. 628, 629 and 633, 12 feet deep, were constructed of 4-inch Akron pipe set in concrete bases and with cemented joints. Filters Nos. 628 and 629 each contained 10 feet in depth of sand which was removed during the driving of wells for the Georgetown water supply. The 18 inches of peat, formerly on the top of Filter No. 629, was removed, making it the same as Filter No. 628. Filter No. 633 contained Lawrence bank sand, 10 feet in depth. The Georgetown sand contained some oxides of iron although much of the iron was lost in the process of driving the wells.

The three filters were kept filled with distilled water, enough being withdrawn each day to make the time of passage through the sand equal to fifteen days. The principal features of the operation of these filters during 1934 were the much larger amounts of iron taken up from the Georgetown sand and the unexplained absorption of dissolved oxygen by the filters containing this sand.

Beginning January 1, 1935, carbon dioxide was dissolved in the distilled water applied to Filters Nos. 628 and 633 and the water was applied by inverting a carboy of water on the top of the filter. Part of the carbon dioxide escaped into the air but the average of a number of determinations of the carbon dioxide in the water over the filter showed the presence of 32 parts per million. This is probably higher than would occur naturally in any water entering the ground. The addition of carbon dioxide to the water was continued for four months without any appreciable change in the color or iron in the effluents from the filters. The conclusion to be drawn from this experiment is that free carbon dioxide as such is not an important factor in the taking up of iron from soil but it is very possible that when carbon dioxide is formed in the soil by decomposition of organic matter, that is, what might be termed nascent carbon dioxide, the action may be greater.

For the next eight months an attempt was made to maintain anaerobic conditions in Filters Nos. 628 and 633 by adding about 50 per cent of sewage that had been filtered through paper to the applied distilled water. The surface of the filter was covered with a wooden float to reduce the surface exposed to air. In spite of this, there was usually 0.1 to 0.2 parts per million dissolved oxygen in the water drawn from Filter No. 628 and 1.0 to 2.0 parts per million in that from Filter No. 633. This reduction of dissolved oxygen also was without appreciable effect and it is apparent that to be effective, the dissolved oxygen must be completely exhausted. In an ordinary slow sand water filter, exhaustion of dissolved oxygen usually results in the appearance of much larger amounts of iron in the effluent. This is particularly true with clogged sewage sand filters.

Distilled water, without added carbon dioxide or sewage, was added to Filter No. 629. Attempts were made to satisfy the oxygen demand of whatever substance was absorbing dissolved oxygen in Filters Nos. 628 and 629. After a number of bottles of hydrogen peroxide had been added, it was learned that ferric hydroxide decomposes hydrogen peroxide, so this line of procedure was abandoned.

Late in the year a dilute solution of hypochlorite was added to the applied water until it appeared in the effluent. After all the hypochlorite had been washed out the absorption of dissolved oxygen had apparently ceased and the iron in the effluent was lower than before. A rough calculation showed that the dissolved oxygen absorbed from the applied distilled water during eighteen months would have oxidized 5 per cent of the iron in the sand if it had all been in the ferrous state, which, of course, it was not. It seems probable that there is some connection between the ability of this sand to absorb dissolved oxygen and the amount of iron absorbed by water passing through it. Unfortunately, ferrous iron was not determined in the sand when the study was begun and the use of Portland cement in the construction of the filters made it impossible to determine any free carbon dioxide that might have been found in the filters. Analyses in the following table do not include any samples when peroxide or hypochlorite was being added.

Average Analyses of Effluents from Filters containing Georgetown Sand or Lawrence Sand
(Parts per Million)

Period of Operation	Filter No. 628 with Coarse and Fine Sand from Georgetown			Filter No. 629 with Coarse and Fine Sand from Georgetown			Filter No. 633 with Lawrence Sand		
	Color	Iron	Dissolved Oxygen	Color	Iron	Dissolved Oxygen	Color	Iron	Dissolved Oxygen
January 1 to May 10*	14	.57	0.2	26	.49	0.4	3	.14	10.
May 10 to December 31**	13	.55	0.1	36	.75	0.2	7	.15	2.9

* Carbon dioxide added to the water applied to Filters Nos. 628 and 633 during this period.
** Clarified sewage added to the water applied to Filters Nos. 628 and 633 during this period.

LAWRENCE CITY FILTERS

As usual this report presents data regarding the operation during the past year of the slow sand filters used for the purification of the water supply of the city of

Lawrence which has been taken from the Merrimack River since 1875. Since 1893 the water taken from the river has been filtered and since 1918 the filtered water has been treated with chlorine as an added factor of safety. Three filters are in use. The oldest filter, 2.2 acres in area, is divided into three sections, one of which is covered; the second filter, 0.75 of an acre in area, was built in 1907 and is covered; the third filter, also covered, was completed early in 1926 and is 0.75 of an acre in area. The average volume of water filtered during 1935 was 5,849,000 gallons per day. Liquid chlorine was applied as a solution in the pump-well at the average rate of 1.32 parts per million and no attempt is made to maintain any definite residual chlorine. It is seldom necessary to change the rate of chlorination. Bacterial samples are collected daily of the water after chlorination and the amount of chlorine to be added is governed by the results of the bacterial examinations. This amount of chlorine is very high compared with what is used with many supplies but is no higher than has been found to be necessary to adequately treat the water of the Merrimack River even after filtration through slow sand filters. The chlorinated water is pumped direct to a storage reservoir holding about 41,500,000 gallons, from which the greater part of the city is supplied by the low service system. This arrangement allows a larger residual chlorine than if the water were pumped directly into the distribution system. In 1931 an electrically driven pump was installed to supply water for the high service system from the reservoir. The bacterial efficiency of the various filters has averaged better than 99 per cent but the coli-aerogenes index, or the number of bacteria of the coli-aerogenes group in 100 cubic centimeters, is still higher than now allowed under the U. S. Treasury Department standard. After chlorination, however, the average number is less than one. There has been some increase in the 20°C. bacteria count in the water of the storage reservoir, due partly to an "after growth" following chlorination and partly to contamination by dust. All the filters, except the west covered filter, are provided with Venturi meters and there are no provisions for collecting samples from this filter. For some time there has been considerable doubt as to the accuracy of the recordings of the meters.

In the summer of 1935 the pumping equipment was changed from steam to electric and two 6,000,000-gallon pumps were installed. On a number of occasions both pumps have been operated at the same time. It is believed that the best results will be obtained from the filters if the pumping is continuous and the rate constant.

Average Bacterial Analyses of Water Collected in Connection with the Lawrence City Filters

	BACTERIA PER CUBIC CENTIMETER			PER CENT OF BACTERIA REMOVED			Coli-Aerogenes Group in 100 cc.
	4 Days 20°C.	24 Hrs.—37°C.		4 Days 20°C.	24 Hrs.—37°C.		
		Total	Red		Total	Red	
1935							
Merrimack River—Intake of City Filters	16,800	1,260	340	–	–	–	11,800
Effluent from East Open Section	150	6	0	99.1	99.5	100.0	5
Effluent from East Covered Section	110	4	1	99.3	99.7	99.7	10
Effluent from West Open Section	87	5	1	99.5	99.6	99.7	11
Effluent from North Covered Filter	72	5	1	99.6	99.6	99.7	29
Mixed Effluents after Chlorine Treatment	9	2	0	99.9	99.8	100.0	–*
Outlet of Distributing Reservoir	180	27	0	98.9	97.8	100.0	–*
Tap at Lawrence City Hall	130	12	0	99.2	99.0	100.0	–*
Tap at Lawrence Experiment Station	80	18	1	99.5	98.5	99.7	–*
Tap on High Service System	140	16	0	99.2	98.7	100.0	–*
1931–1935, Inclusive							
Merrimack River—Intake of City Filters	11,000	720	220	–	–	–	9,100
Effluent from East Open Section	83	5	1	99.2	99.3	99.5	8
Effluent from East Covered Section	96	5	1	99.1	99.3	99.5	10
Effluent from West Open Section	71	6	1	99.4	99.2	99.5	12
Effluent from North Covered Filter	81	6	1	99.3	99.2	99.5	35
Mixed Effluents after Chlorine Treatment	10	2	0	99.9	99.7	100.0	–*
Outlet of Distributing Reservoir	134	26	0	98.8	96.4	100.0	–*
Tap at Lawrence City Hall	120	8	0	98.9	98.9	100.0	–*
Tap at Lawrence Experiment Station	88	13	0	99.2	98.2	100.0	–*
Tap on High Service System	118	16	0	98.9	97.8	100.0	–*

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* Less than 1.

Average Chemical Analyses of Water Collected in Connection with the Lawrence City Filters

(Parts per Million)

Temperature (Deg. F.)	Appearance		Ammonia			Chlorides	Nitrogen as —		Oxygen Consumed	Iron	Hardness
				Albuminoid							
	Turbidity	Color	Free	Total	In Solution		Nitrates	Nitrites			
1935											
Merrimack River—Intake of the Filters											
52	2	40	.152	.226	.163	3.3	.122	.006	5.4	.46	11
Effluent from the Lawrence City Filter (Old East Filter)											
52	0	41	.187	.100	–	4.0	.228	.006	4.0	1.25	15
Effluent from the Lawrence City Filter (North Filter)											
52	0	30	.039	.108	–	3.7	.216	.005	4.2	.26	13
Water from the Outlet of the Distributing Reservoir											
53	0	34	.069	.115	–	5.4	.237	.002	3.9	.59	13
Water from a Tap at Lawrence City Hall											
55	0	37	.050	.101	–	5.4	.248	.002	3.7	.66	13
Water from a Tap at the Lawrence Experiment Station											
55	0	35	.043	.106	–	5.4	.229	.001	3.5	.69	13
1931–1935, Inclusive											
Merrimack River—Intake of the Filters											
50	3	45	.174	.237	.174	3.8	.182	.008	5.7	.63	14
Effluent from the Lawrence City Filter (Old East Filter)											
50	0	45	.191	.106	–	4.4	.318	.004	4.0	1.4	17
Effluent from the Lawrence City Filter (North Filter)											
50	0	30	.040	.107	–	4.2	.309	.003	4.0	.42	15
Water from the Outlet of the Distributing Reservoir											
51	0	38	.082	.109	–	5.7	.320	.002	3.8	1.0	16
Water from a Tap at Lawrence City Hall											
53	0	37	.064	.104	–	5.8	.339	.003	3.6	1.1	16
Water from a Tap at the Lawrence Experiment Station											
52	0	36	.053	.098	–	5.7	.338	.002	3.5	1.1	16

Average Solids in Samples of Water Collected in Connection with the Lawrence City Filters

(Parts per Million)

Unfiltered			Filtered			In Suspension		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
1935								
Merrimack River—Intake of the Filters								
67	28	39	52	21	31	15	7	8
Effluent from the Lawrence City Filter (Old East Filter)								
65	28	37	–	–	–	–	–	–
Effluent from the Lawrence City Filter (North Filter)								
56	23	33	–	–	–	–	–	–
Water from the Outlet of the Distributing Reservoir								
61	24	37	–	–	–	–	–	–
Water from a Tap at Lawrence City Hall								
57	23	34	–	–	–	–	–	–

Water from a Tap at the Lawrence Experiment Station								
56	22	34	–	–	–	–	–	–
1931–1935, Inclusive								
Merrimack River—Intake of the Filters								
64	25	39	51	21	30	13	4	9
Effluent from the Lawrence City Filter (Old East Filter)								
59	23	36	–	–	–	–	–	–
Effluent from the Lawrence City Filter (North Filter)								
53	21	32	–	–	–	–	–	–
Water from the Outlet of the Distributing Reservoir								
57	21	36	–	–	–	–	–	–
Water from a Tap at Lawrence City Hall								
55	20	35	–	–	–	–	–	–
Water from a Tap at the Lawrence Experiment Station								
56	21	35	–	–	–	–	–	–

REPORT OF DIVISION OF TUBERCULOSIS

Alton S. Pope, M.D., *Director*
Louis N. Phaneuf, *Assistant Director*
David Zacks, M.D., *Chief of Clinics*

I have the honor to submit the sixteenth annual report of the Division of Tuberculosis. This report includes an outline of the principal activities of the Division, the annual reports of the four State Sanatoria and the Pondville Cancer Hospital for the fiscal year ending November 30, 1935, together with certain developments in tuberculosis control in the State at large.

Although the reduction in the number of deaths from pulmonary tuberculosis during 1935 was not so great as in 1934 the mortality rate shows a decline somewhat greater than the average decrease for the last five years. The number of cases reported is essentially the same as in 1934, so the proportion of reported cases to deaths will be slightly higher; some indication it is hoped of an improvement in diagnosis and reporting.

The decrease in mortality from extra-pulmonary forms of tuberculosis has been consistently more rapid than that from phthisis, and the drop of over 25 per cent from the 1934 rate represents the greatest proportional reduction ever recorded in the State.

Tuberculosis Deaths and Death Rates per 100,000
Massachusetts 1926–1935

Year	Pulmonary		Other Forms		Total	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1926	2,961	71.0	555	13.3	3,516	84.3
1927	2,774	66.2	429	10.2	3,203	76.4
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.9	248	5.8	2,554	59.7
1932	2,041	47.5	261	6.1	2,302	53.5
1933	2,058	47.7	222	5.1	2,280	52.8
1934	1,902	43.8	214	4.9	2,116	48.7
1935	1,814	41.6	147	3.4	1,961	45.0

State Sanatoria

During the year the four State Sanatoria have furnished 404,192 days of treatment for 2,030 patients. Of these 1,103 were in the institution at the beginning of the year and 927 represent new admissions. The cases were divided as follows: Rutland 755 cases of adult pulmonary tuberculosis; North Reading and Westfield, 798 children with adult or childhood type of the disease; Lakeville, 477 cases of extra-pulmonary tuberculosis. Eighty-nine less patients were treated than during the past year, and 12,180 days less treatment were provided. This decline of approximately three per cent is due chiefly to a decrease in the hospitalization of children in the western part of the State, as little change has taken place at the other institutions.

The continued increase in commodity prices, supplemented by an increase of personnel cost on account of the Forty-Eight Hour Law, has resulted in substantially higher per capita costs during the year. At Rutland the gross cost was $17.48, at North Reading $18.39, Westfield $23.24, and at Lakeville $20.23, per week. This represents an average increase of approximately 17 per cent as compared with 1934.

Reports of the out-patient departments and the consultation clinics of the State Sanatoria show a continued demand for diagnostic service on the part of physicians and local boards of health. In 1935 the four sanatoria made 6,477 diagnostic examinations, 837 more than in 1934, an increase of approximately 15 per cent.

Under a budget appropriation the Department now pays directly for patients from the State Sanatoria admitted to the Massachusetts General Hospital for thoracic surgery. Special wards are reserved for such patients so that the previous interval between their selection at the sanatorium and operation is practically eliminated. This arrangement, which became effective in June, also does away with the necessity of writing for approval of the local board of health for the transfer in each case, and makes it possible to secure operation at the most favorable time.

Fire protection in the form of sprinkler service has now been completed at all the State Sanatoria, with the exception of attics in employees' quarters for which requests have been made in the 1936 budget. Although this does not entirely compensate for lack of fireproof type of construction, it does at least reduce the imminent fire hazard incidental to wooden buildings.

During the year approval of the American Medical Association was obtained for a teaching residency in tuberculosis at Rutland. This position was filled in November and the services of the extra physician are proving helpful in meeting the increased medical work of the institution. Furthermore, such a position should be of definite value for the training of physicians for the specialized work in sanatoria in Massachusetts and elsewhere.

At Lakeville the addition of a new meat refrigerator together with a separate refrigerating unit for the kitchen has relieved the pressure for refrigerator space, and at the same time eliminated the need of constant repairs on the old ammonia line from the power plant.

Contracts have been let for the construction of a new Cancer-Tuberculosis unit on the grounds of the Westfield State Sanatorium. This hospital will provide 50 beds for the treatment of cancer, and 150 for adult patients with pulmonary tuberculosis from the western part of the State. The unit includes a hospital building with diagnostic out-patient departments for cancer and tuberculosis, an operating suite, laboratories, kitchen and dining rooms; also a separate storehouse to supply the entire Westfield plant, a nurses' home for 146 employees, and the necessary additions to the power plant and laundry to care for the new buildings. It is expected this unit will be ready for operation about March, 1937.

At Rutland contracts have been let for re-surfacing the entrance road to the sanatorium, but on account of weather conditions the work cannot be completed until spring. Request has been made in the 1936 budget for reconstruction of the Rutland plant on a three-unit basis which would make it possible to maintain service with only a small loss of beds at any one time. The sanatorium plant, which in 1898 was considered the last word in sanatorium construction, is completely out of date and unsuited for the modern type of treatment. Furthermore, the wooden construction constitutes a serious fire hazard to patients and employees which should be eliminated as soon as possible.

Pondville Cancer Hospital

At Pondville the new wards including 25 patient beds and an addition to the Out-Patient Department, and the new Service Building, with an operating suite, kitchen and dining rooms, were opened December 15. Besides meeting the constantly increasing demand for patient beds at Pondville, this new construction adds a modern operating unit really adequate to the needs of the institution. Equally important, it furnishes the necessary cooking and serving facilities so seriously lacking before. The necessary increase in personnel incidental to the operation of these two buildings, together with the Forty-Eight Hour Law, have seriously overloaded the already inadequate housing facilities at Pondville, and make the addition of new dormitory space imperative. Request was made last year, and has again been included in the 1936 budget, for a 100-bed dormitory for women employees to relieve this situation.

For the first time since the Pondville Hospital was opened, the past year has shown no increase in the number of patients hospitalized. The 3 per cent decrease in admissions for 1935 was due chiefly to an outbreak of streptococcus infections during the spring, which made it necessary to stop all operative work for a period of some four or five weeks. In spite of this decrease in admissions and discharges, the amount of operative work was practically unchanged, and the out-patient examinations showed a slight increase over the preceding year. An appropriation for equipment of a bacteriological laboratory was obtained in the 1935 budget and the laboratory will be opened as soon as space is made available by the removal of certain services into the new buildings.

COUNTY SANATORIA

The high standard of service at the County Sanatoria has been fully maintained during the past year. All the sanatoria have now made satisfactory arrangements for thoracic surgery either in their own institutions or through affiliations with general hospitals, and all are carrying on adequate pneumothorax work.

At Middlesex County Sanatorium a grant has been secured from the Public Works Administration for an addition of 160 patient beds, a new operating suite for thoracic surgery, and the necessary employees' quarters. These buildings are expected to become available early in 1937, and should provide sufficient beds to care for the present and future needs of Middlesex County.

In Norfolk County a Federal grant has also made possible construction of a much needed Nurses' Home.

This fall the Bristol County Sanatorium has added a physician and a nurse to its staff to take over the school tuberculosis clinic work. This means that all the county sanatoria are now carrying on this type of work in their respective districts.

The death of Dr. Harry S. Wagner, Superintendent at Barnstable County Sanatorium, represents a great loss to that section of the State to which he had rendered such outstanding and devoted service. In many ways Dr. Wagner's place cannot be filled, but the County was fortunate in securing the services of Dr. Julius G. Kelley, formerly of the staff of the Desert Sanatorium, Tucson, Arizona, who served over a year as superintendent of the institution during Dr. Wagner's leave of absence in Europe, and who now comes to Pocasset as Superintendent of the Sanatorium.

SCHOOL CLINICS

The second year following the close of the Chadwick Clinics has seen an almost complete absorption of the program by State and County and Municipal sanatoria, and during the past four months Fall River and New Bedford have made arrangements for assuming this work in their respective cities. The children previously examined in the State clinics, and in need of re-examination, are being followed annually by the Follow-Up Clinic of the Department. In towns where the number of such cases is small arrangements have been made where possible to transfer these children to the supervision of the sanatorium responsible for school examinations in that area. The greater part, however, will be followed by the State clinic until the completion of their school life.

NUTRITION SERVICE

Two nutritionists are employed by the Tuberculosis Division. Their work is with parents and children in the school clinics during the winter and with part of this same group of children at health camps during the summer.

Throughout the school year, 1934–35, the nutritionists visited 121 towns, advising with 6,952 children and 2,919 of their parents. In some special cases home visits were made. Probably the most valuable service given was to mothers whose families were supported by welfare or to those who, struggling to remain self-supporting were even more in need of help and encouragement. Special consideration was given to buying, preparing, and serving good meals at low cost. Much emphasis was placed on those factors which cost nothing yet are so valuable to good nutrition: i. e., sleep, rest, sunlight, fresh air, and regularity of eating, sleeping and resting.

At the clinic the nutritionist offers the opportunity for the discussion of economic, disciplinary, and general family problems and it is she who, after the parent or child receives from the doctor a report of x-ray and physical findings, works out with the parent and child preferably—or with the child alone—a definite practical program to be carried home and followed through the year.

In the summer of 1935, twelve summer camps requested the services of a nutritionist. Her visit with the opportunity to observe a full day's routine at camp enabled her to give assistance in menu planning, kitchen equipment, serving of food, children's eating habits, and food buying. Everywhere camp people were eager for new knowledge of nutrition and showed without exception a realization of the importance of food well planned. The individual problems of the camps were discussed with the directors, and emphasis was placed on the importance of rest, of free play, and projects in addition to the purely nutritional aspects of camp life.

Social Service

During the year the department workers made 927 visits to homes of patients in 135 different cities and towns and made 2,385 contacts with medical and social agencies.

In addition to their routine investigation of all cases of children admitted to the Department institutions and their cooperation with the superintendents in the social cases referred to them, the social workers during the spring joined with the nutrition workers of the Department in a study of the comparative economic and social conditions of a group of families before and during the current depression. The results of this study were reported by the Commissioner at the annual meeting of the National Tuberculosis Association at Saranac Lake in June.

During the summer the workers again took an active part in the program for theological students at Lakeville, meeting with them weekly and giving six talks on social service in tuberculosis.

The visiting of certain of our families by nutrition workers for special nutritional advice has been of decided value and suggests the possibility of further cooperation between these services.

Personnel Changes

Dr. Samuel B. Kirkwood, Epidemiologist, who resigned June 1st, has been succeeded by Dr. Edward G. Huber. Dr. Huber brings to the Division exceptional training in epidemiology and wide experience in hospital administration.

On account of changes in the work of the Follow-Up Clinic one position of physician was dropped and replaced with that of a nurse on November 1. In this exchange the services of Dr. Harry C. Low with the Department were terminated, and Miss Mildred Givan was appointed as Field Nurse. Dr. Joseph W. Reddy, who has served on the staff of the Chadwick Clinics since their inception in 1924, is on a year's leave of absence on account of his health. Dr. Reddy's place is being filled by Dr. Philip E. Sartwell.

Subsidy

For the first time since the passage of the subsidy act there has been no substantial increase in the amount of state subsidy to cities and towns for the hospitalization of tuberculosis patients in sanatoria approved by the Department. In 1935 the subsidy claims allowed amounted to a total $449,391.10, compared with $461,419.37 in 1934. As it is unlikely that there will be further construction at county or municipal sanatoria after the completion of the present addition at Middlesex County, this probably represents the approximate peak for subsidy payments.

LAKEVILLE STATE SANATORIUM

Resident Officers

Leon A. Alley, M.D., *Superintendent.*
John J. Decker, M.D., *Assistant Superintendent.*
Peter Ferrini, M.D., *Senior Physician.*
Arthur Kanserstein, M.D., *Senior Physician.*
Louis Alpert, M.D., *Assistant Physician.*
William D. Wilder, M.D., *Assistant Physician.*
Alvin O. Severance, M.D., *Assistant Physician.*
Emanuel Kline, D.M.D., *Dentist.*
Caroline T. White, R.N., *Superintendent of Nurses.*
Grace Daley, *Head Teacher.*
Marion N. Atwood, *Head Occupational Therapist.*
Chester Taylor, *Steward.*
Florence S. Monroe, *Treasurer*
Susan M. Murphy, *Head Housekeeper.*
Robert A. Kennedy, *Chief Power Plant Engineer.*
T. Frank Mahony, *Head Farmer.*

NON-RESIDENT OFFICERS

ZABDIEL B. ADAMS, M.D., *Senior Physician (Orthopedic Surgery).*
LOUIS A. O. GODDU, M.D., *Senior Physician (Orthopedic Surgery).*
ROGER C. GRAVES, M.D., *Senior Physician (Urology).*
FLETCHER H. COLBY, M.D., *Senior Physician (Urology).*
WILLIAM P. BEETHAM, M.D., *Senior Physician (Ophthalmology).*
GEORGE A. MOORE, M.D., *Senior Physician (Surgery).*
SHIELDS WARREN, M.D., *Senior Physician (Pathology).*
E. LAWRENCE OLIVER, M.D., *Senior Physician (Dermatology).*
EDWARD E. JONES, M.D., *Senior Physician (Otology, Rhinology, Laryngology).*

Report of the Superintendent

To HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-sixth annual report of the Lakeville State Sanatorium for the year ending November 30, 1935.

FINANCIAL STATEMENT

During the year there has been expended $298,374.77 for maintenance, a gross weekly per capita cost of $20.23. There has been collected from miscellaneous sources (the total of all collections) $134,645.57. Deducting this amount from the gross maintenance expenses leaves a net expense of $163,729.20 and a net weekly per capita cost of $9.13. There has been collected from private sources $4,014, from cities and towns $126,023.23, from the State Board of Retirement $104, and from sales $2,122.32.

There were 6 patients supported wholly or in part by private funds, 179 by cities and towns, 2 state wards, 43 wholly by state, and 49 on whom settlement has not been determined.

As authorized by Chapter 162, Acts of 1934 ($6,700 for Lamp Treatment Room and Equipment on Men's Ward), $53.35 was expended during the year (total spent $6,692.33). Completed. As authorized by Chapter 162, Acts of 1934 ($6,700 for Lamp Treatment Room and Equipment on Women's Ward) $33.52 was expended during the year (total spent $6,698.70). Completed. As authorized by Chapter 162, Acts of 1934 ($4,000.00 for X-ray Machine and Fluoroscope) $3,898.65 was expended during the year (total spent $3,957.00). Completed. As authorized by Chapter 245, Acts of 1935 ($1,600.00 for Fire Protection and Sprinklers) $1,331.11 has been expended during the year. Not completed. Under Emergency Public Works Commission Construction Docket 1354 Mass. State Project H-1 $5,000 was appropriated for two Sewage Filter Beds. $524.85 was expended during the year. Total spent, $4,152.33.

POPULATION

There were 282 patients in the sanatorium at the beginning of the year, December 1, 1934, and 278 patients at the close, November 30, 1935. The largest number present at any one time was 299 and the smallest 265. The daily average number of patients was 283.57, children 172.60, adults 110.97. There were 195 patients admitted during the year. For the classification of patients admitted, your attention is called to Table 6. The average age of patients admitted was 28 years. Including deaths there were 200 patients discharged and the average duration of residence was 577 days. Of those discharged 132 gained 2,416 pounds, an average gain of 18.30 pounds per person. Of those discharged there were 105 arrested, 10 apparently arrested, 18 quiescent, 15 improved, 8 unimproved, 13 deaths, 10 not considered (duration of treatment being less than one month), and 21 non-tuberculous. There were 103,504 hospital days of treatment, 620 less than last year. The average number of employees and officers during the year was 186.06.

MEDICAL REPORT

There have been but few, if any, changes in the general medical and surgical treatment during the past year. We are still impressed by the importance of early diagnosis and treatment. The end results of treatment show from year to year that the earlier the diagnosis and more complete the treatment, the better and quicker the recovery of the patient. Many deformities can be prevented by early treatment that cannot be corrected if permitted to develop. As time goes on we see the need of definite and radical measures for the treatment of the serious chronic discharging sinuses if we are to prevent the development of amyloid disease with its fatal termination.

Of the 195 patients admitted, 58 or 29% showed pulmonary infection by x-ray. Seventeen of this number had clinical evidence of pulmonary tuberculosis. Of the 200 patients discharged 13 died. Post mortem examinations were made on ten. Table 9, that shows the causes of death, notes the presence of amyloid disease in 7 cases. Sinuses, with copious discharge, were present in each of these cases.

Considerable new laboratory equipment has been added and, under the direction of Drs. Twinam and Severance, the efficiency has been raised and new activities added.

Infra-red lamps have been added to our equipment and have proved most useful in those patients suffering from the pains in tuberculous joints.

Research work is being carried along on the results of ultraviolet therapy for tuberculous cystitis in some of the renal cases under treatment here. This work has been stimulated by the development of a new type of applicator suitable for transmitting ultraviolet rays into the bladder. This work has not progressed far enough as yet to draw any conclusions. This applicator is also being used in the treatment of deep sinuses of patients suffering from other forms of tuberculosis. The work in this field has proved very encouraging thus far.

Dick and tuberculin tests have been added to the employees' immunization program.

School clinic work is under way. This institution is serving the southern parts of Plymouth and Bristol Counties.

Out-patient clinics have been held daily for consultation cases and ex-patient check up.

We have been fortunate this year in that the only contagious diseases that we have had to contend with were three cases of chicken pox among the children on one ward.

An article on extra-pulmonary tuberculosis was published in *The Commonhealth* in March, 1935, as written by the superintendent.

Institutional Activities

Lectures and demonstrations by the superintendent and medical staff have been given to the following classes and organizations:

Pentucket Association of Physicians of Haverhill.
School of Handicrafts at Cambridge.
Postgraduate School of Nursing, Middlesex County Sanatorium, Waltham.
Postgraduate School of Nursing, Essex County Sanatorium, Middleton.
Senior Students, Middlesex College of Medicine and Surgery.
Senior Students, Boston University School of Medicine.
Postgraduate Class in Orthopedics of Harvard Medical School.
Senior Theological Students of Andover Newton Seminary.
Summer Class of Theological Students in Institutional Training.

The following meetings were held at the sanatorium during the year:

Trudeau Society of Boston.
Plymouth District of the Massachusetts Medical Society.
Summer Conference of Theological Students.

The occupational therapy activities have increased from year to year, especially the shop work and correspondence courses that have been made possible through the Department of Education. Three hundred and forty patients were enrolled in occupational therapy activities, working a total of 9,255 hours, which resulted in the completion of 2,068 articles of various kinds. The sanatorium paper, *The Interpreter*, has been published monthly and has been the means of distributing medical articles and other educational material to the patients. The classes in Home Hygiene have been held weekly during the spring and fall months. Girl Scout Troop meetings have been held weekly.

The farm has had another successful year. The dairy and poultry plant both show substantial profits. Due to the increase in the cost of both grain and labor, the profits as shown are reduced somewhat below those for the previous fiscal year. One of the double teams was replaced by a 1½-ton truck. This truck, with plow attachment, will relieve the snow removal problem in the winter. The herd continues tuberculosis free.

Personnel Changes

The following changes in the personnel have occurred during the year:

Dr. Peter Ferrini was reappointed senior physician on December 17, 1934, succeeding Dr. C. W. Houghton, who resigned the latter part of last year.

We note with the deepest regret the death of Dr. Raphael N. Joseph, assistant physician on the resident staff, who died of pneumonia here on March 1, 1935. Dr. William D. Wilder was appointed assistant physician on April 4, 1935, to the vacancy resulting from the death of Dr. Joseph.

Dr. Chin S. Chang, for many years bacteriologist, resigned March 23, 1935. Dr. C. W. Twinam was appointed to fill the vacancy on April 1, 1935. He was granted a leave of absence on September 21, 1935, to accept a fellowship at the Harvard School of Public Health. Dr. A. O. Severance was appointed October 1, 1935, to have charge of the laboratory during Dr. Twinam's leave of absence.

Improvements and Changes

An addition to the Nurses' and Staff's dining rooms was started in November. Materials for this project were furnished by State funds and the labor furnished by the W.P.A.

Another W.P.A. project made possible the cutting of brush at the Water Shed and at various other designated spots on the institution grounds.

Two new flag poles were erected facing on the main highway, replacing the old wooden ones that were removed because of their poor and unserviceable condition.

Additions to the refrigerators in the basement of the Administration Building have been completed and a new refrigerating system has been installed to take care of the meat, kitchen, bakery, and ice cream units, separating the units in the Administration Building from the central power plant.

Automatic sprinklers were installed in the South Pavilion and a hydrant was located between the South Pavilion and the Superintendent's residence.

In October the employees were placed on the forty-eight hour a week basis, the Nursing and Kitchen departments were particularly affected by this change.

Recommendations

The added employees needed for the forty-eight hour work week have thrown a very heavy burden upon our already overcrowded housing facilities. Prior to the increase there were approximately thirty employees living on the outside because of inadequate housing conditions for them. The twenty-six new employees taken on have created a condition that calls for the construction of additional male and female quarters at the earliest possible date.

On the Children's East Ward, which is the building in which small children from fifteen months to six years are treated, there are no facilities for isolation to make possible added quiet for any of the sickest children. A request has been made in the budget for an addition to the center part of this building in order that we may have rooms available for sick children, who should not and cannot be properly treated in the open ward. If this addition is of two-story construction it will add nine rooms to our present overcrowded employees' quarters without much added expense.

The patients' classes in the occupational therapy work shop and library have increased from year to year until the space and facilities for these activities are now much too small and a request has been made in the budget for an addition to the present building to provide more space in the work shop and a new class room.

The demands for service by the medical staff upon the laboratory have increased to the point that an additional technician is badly needed in order to keep up the routine work as well as make possible some research work and blood studies on the patients under treatment here.

ACKNOWLEDGMENTS

The Rev. Father Danahy, the Rev. Father O'Brien, the Rev. Father Reid, the Rev. John P. Garfield, the Rev. William C. Kilpatrick, the Rev. James L. Hynes, the Rev. George N. Parker, all of Middleboro, and Mr. Moses Sedar, of Boston, have ministered to the spiritual needs of the patients most satisfactorily. The religious work, especially with the children, has been most helpful.

I express the appreciation of the patients and employees to the many friends who contributed so generously at Christmas time to those less fortunate than themselves who were obliged to spend the holiday in the sanatorium.

My sincere thanks to the medical staff, heads of departments, and the many loyal employees for their help and cooperation during the past year.

To you, I express my appreciation for your confidence and helpful guidance.

SURGICAL REPORT

Operations

The following operations were performed during the year:

Amputations:	
Arm	2
Leg	3
Appendectomies	2
Arthrodeses:	
Hip	14
Knee	2
Sacro-iliac	2
Spine	13
Symphysis Pubis	1
Wrist	2
Removal bone plates from knee	1
Curettage Brodie's abscess	1
Curettage Radius	1
Curettage Tibia	2
Curettage Ulna	2
Dilation and Curettage	1
Excision Nephrectomy wound	1
Herniotomies	3
Hysterectomy	1
Incision and Drainage of Kidney	1
Osteotomy Hip	2
Removal Sequestrum and foreign body	1
Circumcision	1
Cystoscopies	18
Fracture of Wrist	1
Incision and Drainage	6
Infection on Hand	5
Infection on Shoulder	1
Lacerations including those requiring sutures	23
Removal of grease pack	2
Tonsillectomies and Adenoidectomies	6
Biopsy of Sternum	1
	122

Casts

Plaster casts for the year were as follows (types classified):

Anterior shells	18
Posterior shells	18
Buckets	7
Boots	28
Cylinder to arm	19
Cylinder with boot	32
Cylinder to leg	43
Jackets	47
Jacket with collar	12
Jacket with cylinder to arm	7
Jacket with helmet	26
Jacket with long single spica	14
Jacket with short double spica	53
Jacket with shoulder straps	82
Moulds for feet	4
Moulds for neck	4
Moulds for wrist	2
Short spica	37
Long and short spica	39
Long single spica	26
Long double spica	4
Reinforcements	57
	579

Consultation Examination

	Positive	Suspicious	Negative	Extra-Pulmonary	Re-Exam.	Ex-Patients	Totals
Out-patients	6	4	45	3	6	69	133
Employees	–	–	167	1	–	–	168
	6	4	212	4	6	69	301

LABORATORY, X-RAY AND PHOTOGRAPHIC REPORT

Laboratory

Clinical Microscopy		Number
Blood	Hemoglobin determination	465
	Red blood cell counts	248
	White blood cell counts	505
	Differential counts	455
	Blood culture	8
	Blood grouping	16
	Coagulation time	8
	Bleeding time	8
	Sedimentation tests	8
Chemical Analysis:		
	Blood sugar	23
	Non-protein nitrogen	93
	Occult blood tests	43
	Gastric analysis	7
Sputum	Positive T.B.	20
	Negative T.B.	122
Urine analysis		2,717
Spinal fluid,	Positive T.B.	1
Feces		56
Pleural fluid		4
Abdominal fluid		32

Bacteriological and Serological Tests		
Nose and throat cultures	Negative K.L.	236
	Positive K.L.	26
Smears (from pus or culture)		1,186
Cultures		590
Isolation of tubercle bacilli		98
Phthalein test		65
Typhoid agglutination tests (Widal)		63
Blood drawn for Wassermann and Hinton tests		273
Von Pirquet test	Positive	175
	Negative	13
Mantoux tests	Positive	10
	Negative	3
Injections of material into guinea pigs and rabbits		264
Autopsies:	Positive T.B.	99
	Negative T.B.	184

Pathology	
Surgical specimens	75
Biopsies	2
Post mortem cases	10
Tissue sections (paraffin)	479
Preparation of Media	114
Pathological diagnosis	74
Examinations for other hospitals	20
Total number of examinations	8,898

X-rays

Number of x-rays taken from December 1, 1934, to November 30, 1935 . 2,676

Photographs

Number of photographs taken from December 1, 1934, to November 30, 1935 493

DENTAL REPORT

From December 1, 1934, to November 30, 1935

Examinations	434
Prophylactic treatments	451
Fillings:	
Permanent teeth	705
Deciduous teeth	52
Extractions:	
Permanent teeth	184
Deciduous teeth	231
Treatments	961
Restorations:	
Dentures:	
Full	10
Partial	2
Repair	2
Other:	
Bridges	2
Davis crown	1
Bridge repair	1
Retainer appliance	1
Radiographs	243
Irrigations	174
Root canal treatments	37
Pulpectomies	6
Apecotomies	3
Vincent's infection treatment	48
General anesthesia:	
Ether	1
Nitrous oxide	1
Ethyl chloride	4
Local anesthesia	
Novocaine	203
Ethyl chloride	27
Topical	169
Oral surgical operations	26
Orthodontia treatments	69
	4,048
Visits	2,153
New patients	209

SCHOOL REPORT

Fifteen groups of children, made up from 118 patients, who were able to carry on school work, received instructions in the various grade courses. The follow-up work on discharged patients has been gratifying as it shows that practically every one of these children has been able to find his proper place in the class in the public school in which he normally would be found, according to his age. Many of these children spent from one to four years under treatment. The courses of study found practical and successful in previous years have been continued. The school teachers have cooperated with the department of occupational therapy in tutoring those patients requiring assistance in the University Extension courses.

Respectfully,

LEON A. ALLEY, M.D.
Superintendent.

TABLE 1.—*Admissions and Discharges*

	ADULTS		CHILDREN		Totals
	Males	Females	Males	Females	
Patients in the sanatorium Nov. 30, 1934	69	40	98	76	283
Patients admitted Dec. 1, 1934, to Nov. 30, 1935	64	64	37	30	195
Patients discharged Dec. 1, 1934, to Nov. 30, 1935	65	56	42	37	200
Patients remaining in sanatorium Nov. 30, 1935	69	49	92	68	278
Daily average number of patients	68.58	42.39	95.65	76.96	283.57
Deaths (included in number discharged)	6	2	5	–	13

TABLE 2.—*Civil Condition of Patients Admitted*

Single	29	20	37	29	115
Married	30	32	–	1	63
Widowed	3	4	–	–	7
Divorced	1	6	–	–	7
Separated	1	2	–	–	3
	64	64	37	30	195

TABLE 3.—*Ages of Patients Admitted*

Under 5 years	–	–	4	–	4
5 to 9 "	–	–	11	7	18
10 to 14 "	–	–	11	12	23
15 to 19 "	–	–	10	10	20
20 to 29 "	20	24	1	1	46
30 to 39 "	14	17	–	–	31
40 to 49 "	17	15	–	–	32
50 to 59 "	9	5	–	–	14
60 to 69 "	3	3	–	–	6
70 and over	1	–	–	–	1
	64	64	37	30	195
Average Age 28 years.					

Table 4.—*Nativity and Parentage of Patients Admitted*

Place of Nativity	Adults						Children						Totals		
	MALES			FEMALES			MALES			FEMALES					
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:															
Massachusetts	24	8	8	35	11	6	34	16	17	27	12	13	120	47	44
Other New England States	2	1	1	4	5	9	1	3	5	–	3	1	7	12	16
Other States	5	3	5	7	7	5	–	1	1	1	4	3	13	15	14
	31	12	14	46	23	20	35	20	23	28	19	17	140	74	74
Other Countries:															
Armenia	2	2	2	–	–	–	–	1	1	–	1	1	2	4	4
Canada	8	10	10	9	11	14	1	3	1	1	1	2	19	25	27
China	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
England	–	–	1	–	3	2	–	–	–	–	–	–	–	3	3
Germany	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Greece	2	2	2	–	–	–	–	–	–	–	–	–	2	2	2
Ireland	2	7	7	3	12	14	–	2	1	–	2	2	5	23	24
Italy	6	10	9	2	5	5	1	4	4	1	4	4	10	23	22
Latvia	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Lithuania	1	1	2	–	1	1	–	–	–	–	–	–	1	2	3
Norway	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–
Poland	1	4	3	–	1	1	–	–	–	–	1	–	1	6	4
Porto Rico	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Portugal	3	3	3	2	4	4	–	3	1	–	2	1	5	12	9
Russia	3	4	4	1	1	1	–	1	2	–	–	1	4	6	8
Scotland	–	1	–	1	1	–	–	–	–	–	–	–	1	2	–
Sicily	–	–	–	–	–	–	–	1	1	–	–	–	–	1	1
Sweden	–	1	1	–	–	–	–	–	–	–	–	–	–	1	1
Western Islands	–	–	–	–	–	–	–	1	1	–	–	–	–	1	1
West Indies	1	1	1	–	–	–	–	–	–	–	–	–	1	1	1
Unknown	–	2	1	–	1	2	–	1	2	–	–	2	–	4	7
	64	64	64	64	64	64	37	37	37	30	30	30	195	195	195

Table 5.—*Residence of Patients Admitted*

	Adults	Children	Totals
Amesbury	1	–	1
Andover	–	1	1
Attleboro	–	1	1
Berkley	1	–	1
Billerica	1	–	1
Boston	32	24	56
Bridgewater	1	1	2
Brockton	3	–	3
Cambridge	7	–	7
Chelsea	3	1	4
Chicopee	1	–	1
Dennis	–	1	1
Duxbury	–	1	1
Everett	2	–	2
Fall River	–	1	1
Fitchburg	–	1	1
Framingham	1	–	1
Franklin	–	1	1
Gardner	1	–	1
Greenfield	1	1	2
Haverhill	2	1	3
Holbrook	2	2	4
Holyoke	2	–	2
Hudson	–	1	1
Lawrence	2	1	3
Lynn	2	1	3
Malden	3	–	3
Mansfield	1	–	1
Marion	1	–	1
Medford	3	–	3
Melrose	2	–	2
Milford	–	1	1
New Bedford	4	1	5
Newburyport	1	1	2
Newton	3	1	4

	Adults	Children	Totals
North Adams	1	–	1
Northampton	–	1	1
Norwood	1	1	2
Phillipston	1	–	1
Pittsfield	1	1	2
Plymouth	1	–	1
Quincy	4	1	5
Randolph	–	2	2
Revere	1	–	1
Rutland	–	1	1
Salem	2	–	2
Saugus	1	–	1
Somerville	5	4	9
Southbridge	1	–	1
Springfield	7	1	8
Taunton	3	2	5
Tewksbury	–	1	1
Tisbury	–	1	1
Uxbridge	–	1	1
Wakefield	1	–	1
Waltham	1	–	1
Warren	1	–	1
Warwick	1	–	1
Watertown	1	2	3
Webster	1	–	1
Wellesley	1	–	1
Wellfleet	–	2	2
Westfield	3	–	3
Weymouth	3	–	3
Winchendon	1	–	1
Woburn	–	1	1
Worcester	1	1	2
Wrentham	1	–	1
	128	67	195

TABLE 6.—*Diagnosis on Admission*

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
One Lesion						
Tb. adenitis, cervical	1	2	6	–	9	4.61
Tb. adenitis, mesenteric	–	2	1	–	3	1.53
Tb. elbow	–	1	–	–	1	.51
Tb. enteritis	–	–	–	1	1	.51
Tb. fistula-in-ano	1	–	–	–	1	.51
Tb. hip	–	2	–	3	5	2.56
Tb. knee	3	2	–	–	5	2.56
Tb. nephritis	4	3	–	–	7	3.58
Tb. ophthalmia	1	–	–	2	3	1.53
Tb. peritonitis	1	1	4	2	8	4.10
Tb. sacro-iliac	1	–	–	–	1	.51
Tb. skin	1	3	–	2	6	3.07
Tb. spine	3	5	5	1	14	7.12
Tb. greater trochanter	–	–	–	1	1	.51
Tb. uterus	–	1	–	–	1	.51
Tb. wrist	1	–	–	–	1	.51
	17	22	16	12	67	–
One Lesion with X-ray Evidence of Pulmonary Infection						
Tb. abscess, thigh	–	1	–	–	1	.51
Tb. adenitis, cervical	1	2	1	–	4	2.05
Tb. ankle	–	2	1	–	3	1.53
Tb. colitis	–	1	–	–	1	.51
Tb. endometritis	–	1	–	–	1	.51
Tb. forearm (soft tissues)	–	1	–	–	1	.51
Tb. hip	1	1	2	1	5	2.56
Tb. knee	–	1	–	–	1	.51
Tb. ophthalmia	1	2	–	1	4	2.05
Tb. nephritis	–	–	–	1	1	.51
Tb. spine	4	–	–	–	4	2.05
	7	12	4	3	26	–
One Lesion with Evidence of Pulmonary Tuberculosis Inactive						
Tb. abscess, psoas	1	–	–	–	1	.51
Tb. adenitis, cervical	–	–	–	1	1	.51
Tb. ankle	1	1	–	–	2	1.02
Tb. colitis	–	1	–	–	1	.51
Tb. hip	2	–	–	–	2	1.02
Tb. spine	1	–	–	–	1	.51
	5	2	–	1	8	–
One Lesion with Pulmonary Tuberculosis Active						
Tb. adenitis, cervical	–	1	–	–	1	.51
Tb. hip	–	–	2	–	2	1.02
Tb. spine	–	–	1	–	1	.51
	–	1	3	–	4	–
Two Lesions						
Tb. adenitis, cervical bilateral	–	–	–	1	1	.51
Tb. adenitis, cervical and axillary	1	–	–	1	2	1.02
Tb. adenitis, cervical, Tb. ankle	–	–	1	–	1	.51
Tb. cystitis, Tb. nephritis	2	–	–	–	2	1.02
Tb. epididymitis bilateral	1	–	–	–	1	.51
Tb. hand, Tb. skin	–	–	1	–	1	.51
Tb. hip, right, Tb. hip, left arrested	–	–	1	–	1	.51
Tb. hip, Tb. spine, arrested	1	–	–	–	1	.51
Tb. ophthalmia bilateral	–	3	1	2	6	3.07
Tb. ophthalmia, Tb. adenitis, mesenteric arrested	–	1	–	–	1	.51
Tb. peritonitis, Tb. adenitis, mesenteric	–	1	–	–	1	.51
Tb. peritonitis, Tb. salpingitis	–	1	–	1	2	1.02
Tb. rectum, Tb. sigmoid	–	1	–	–	1	.51
Tb. sacro-iliac, Tb. nephritis	1	–	–	–	1	.51
Tb. sacro-iliac bilateral	1	–	–	–	1	.51
Tb. salpingitis bilateral	–	1	–	–	1	.51
Tb. spine, Tb. adenitis, cervical	1	–	–	–	1	.51
Tb. spine, Tb. sacro-iliac	–	1	–	–	1	.51
Tb. spine, Tb. shoulder arrested	1	–	1	–	2	1.02
Tb. wrist, Tb. elbow	–	–	–	1	1	.51
	9	9	5	6	29	–

TABLE 6.—*Diagnosis on Admission*—(Continued)

	ADULTS		CHILDREN		Totals	Percentages
	Males	Females	Males	Females		
Two Lesions with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical, Tb. ankle	–	–	–	1	1	.51
Tb. adenitis, cervical and axillary	–	–	1	–	1	.51
Tb. adenitis, cervical, Tb. skin	–	–	1	–	1	.51
Tb. cystitis, Tb. nephritis	1	1	1	–	3	1.53
Tb. knee, Tb. adenitis, cervical	–	–	1	–	1	.51
Tb. ophthalmia bilateral	–	1	–	2	3	1.53
Tb. spine, Tb. hip	1	–	–	–	1	.51
	2	2	4	3	11	–
Two Lesions with Pulmonary Tuberculosis Active						
Tb. hip, Tb. brain abscess	1	–	–	–	1	.51
Tb. hip, Tb. spine arrested	–	1	–	–	1	.51
Tb. peritonitis, Tb. adenitis cervical	1	–	–	–	1	.51
	2	1	–	–	3	–
Three Lesions						
Tb. adenitis, cervical, axillary and inguinal	–	–	1	–	1	.51
Tb. adenitis, cervical, bilateral Tb. epididymitis	1	–	–	–	1	.51
Tb. ankle, Tb. shoulder, arrested, Tb. wrist, arrested	–	1	–	–	1	.51
Tb. cystitis, Tb. nephritis, Tb. adenitis, cervical	–	1	–	–	1	.51
Tb. cystitis, Tb. nephritis, Tb. epididymitis	1	–	–	–	1	.51
Tb. cystitis, Tb. nephritis, Tb. adenitis, mesenteric arrested	–	1	–	–	1	.51
Tb. elbow, left, Tb. elbow, right arrested, Tb. spine	1	–	–	–	1	.51
	3	3	1	–	7	–
Three Lesions with X-ray Evidence of Pulmonary Infection						
Tb. adenitis, cervical, axillary and inguinal	–	–	1	–	1	.51
Tb. salpingitis bilateral, Tb. peritonitis	–	1	–	–	1	.51
Tb. wrist, Tb. nephritis, Tb. knee, arrested	–	1	–	–	1	.51
	–	2	1	–	3	–
Three Lesions with Pulmonary Tuberculosis Active						
Tb. enteritis, Tb. peritonitis, Tb. epiglottis	1	–	–	–	1	.51
	1	–	–	–	1	–
Four Lesions						
Tb. epididymitis bilateral, Tb. nephritis, Tb. adenitis, mesenteric, arrested	1	–	–	–	1	.51
Tb. hip, Tb. epididymitis, Tb. orchitis, Tb. nephritis	1	–	–	–	1	.51
Tb. knee, Tb. elbow, Tb. spine, Tb. wrist	1	–	–	–	1	.51
Tb. knee, Tb. larynx, Tb. dactylitis, Tb. skin arrested	–	1	–	–	1	.51
Tb. orchitis, Tb. cystitis, Tb. epididymitis, Tb. nephritis	2	–	–	–	2	1.02
Tb. spine, Tb. hip, Tb. abscess sterno clavicular, Tb. wrist, arrested	1	–	–	–	1	.51
	6	1	–	–	7	–
Four Lesions with X-ray Evidence of Pulmonary Infection						
Tb. skin, Tb. dactylitis bilateral, Tb. larynx	–	1	–	–	1	.51
	–	1	–	–	1	–

Table 6.—*Diagnosis on Admission*—(Concluded)

	Adults		Children		Totals	Percentages
	Males	Females	Males	Females		
Four Lesions with Evidence of Pulmonary Tuberculosis Inactive						
Tb. spine, Tb. nephritis, Tb. epididymitis bilateral .	1	–	–	–	1	.51
	1	–	–	–	1	–
Five Lesions						
Tb. cystitis, Tb. nephritis, Tb. orchitis, Tb. epididymitis, Tb. spine, arrested . .	1	–	–	–	1	.51
Tb. orchitis, Tb. epididymitis bilateral, Tb. nephritis, Tb. knee, arrested . . .	1	–	–	–	1	.51
	2	–	–	–	2	–
Non-tuberculous						
Actinomycosis . . .	–	–	–	1	1	.51
Carcinoma of the lip . .	1	–	–	–	1	.51
Cystitis	1	–	–	1	2	1.02
Nephritis	–	–	1	–	1	.51
Obstipation	1	–	–	–	1	.51
Osteomyelitis . . .	5	–	–	–	5	2.56
Chronic otitis media . .	–	1	–	–	1	.51
Peritonitis	–	–	–	1	1	.51
Skin	–	1	–	–	1	.51
Sternum	1	–	–	–	1	.51
Unclassified . . .	–	6	2	2	10	5.12
	9	8	3	5	25	–

Table 7.—*Condition on Discharge*

	Adults		Children		Totals	Percentages
	Males	Females	Males	Females		
Arrested	27	27	28	23	105	52.5
Apparently arrested . .	4	2	1	3	10	5.
Quiescent	12	2	3	1	18	9.
Improved	5	9	–	1	15	7.5
Unimproved	1	5	–	2	8	4.
Deaths	6	2	5	–	13	6.5
Not considered . . .	3	4	2	1	10	5.
Non-tuberculous . . .	7	5	3	6	21	10.5
	65	56	42	37	200	–

Table 8.—*Deaths*

Duration of Disease	Adults		Children		Totals	Length of Residence in Sanatorium				
						Adults		Children		Totals
Months	Males	Females	Males	Females		Males	Females	Males	Females	
Less than 1 month	–	–	–	–	–	–	–	1	–	1
1 to 2 months	–	–	–	–	–	1	–	–	–	1
2 to 3 "	–	–	1	–	1	–	–	–	–	–
3 to 4 "	–	–	–	–	–	1	–	–	–	1
4 to 5 "	–	–	–	–	–	–	–	1	–	1
5 to 6 "	–	–	–	–	–	1	–	–	–	1
6 to 7 "	–	–	–	–	–	2	–	–	–	2
7 to 8 "	–	–	–	–	–	–	–	1	–	1
8 to 9 "	–	–	–	–	–	–	–	–	–	–
9 to 10 "	–	–	–	–	–	–	–	–	–	–
10 to 12 "	–	–	–	–	–	–	–	–	–	–
12 to 18 "	2	–	1	–	3	–	–	1	–	1
18 to 24 "	–	–	–	–	–	–	–	–	–	–
Over 2 years	4	2	3	–	9	1	2	1	–	4
	6	2	5	–	13	6	2	5	–	13

TABLE 9.—*Causes of Death*

	ADULTS		CHILDREN		Totals
	Males	Females	Males	Females	
Tb. ankle, Tb. tonsils, Pulmonary Tb. arrested	1	–	–	–	1
Tb. elbow, Tb. adenitis cervical, amyloidosis	–	–	1	–	1
Tb. epididymitis, bilateral, Tb. nephritis, amyloidosis	–	–	1	–	1
Tb. hip, pulmonary Tb., Tb. brain abscess	1	–	–	–	1
Tb. hip, pulmonary Tb., amyloidosis	1	–	–	–	1
Tb. hip, Tb. adenitis cervical and mesenteric, Tb. peritonitis, pulmonary Tb. quiescent, amyloidosis, hemorrhagic colitis	–	1	–	–	1
Tb. peritonitis with appendicial abscess	–	–	1	–	1
Tb. peritonitis, Tb. spine, Tb. hip, Tb. meningitis	–	1	–	–	1
Tb. spine, Tb. adenitis cervical, Tb. wrist, Tb. ankle, Tb. fibula, Tb. trochanter, amyloidosis	–	–	1	–	1
Tb. spine, Tb. greater trochanter, Tb. lesser trochanter	1	–	–	–	1
Tb. spine, Tb. nephritis, Tb. epididymitis, pulmonary Tb. arrested, amyloidosis	1	–	–	–	1
Tb. spine, Tb. sinus in groin, amyloidosis	–	–	–	–	1
Tb. spine, Tb. pericarditis	1	–	1	–	1
	6	2	5	–	13

Financial Report, Lakeville State Sanatorium, 1935

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1935.

STATEMENT OF EARNINGS

Board of patients:			
Private	$2,709 00		
Cities and towns	123,314 23		
		$126,023 23	
Personal services:			
Reimbursement from Board of Retirement		$104 00	
Sales:			
Food	$267 15		
Furniture and household supplies	16 71		
Medical and general care	37 15		
Heat, light and power	4 00		
Farm	1,669 32		
Garage, stable and grounds	95 96		
Repairs, ordinary	4 75		
Arts and crafts sales	27 28		
Total sales		$2,122 32	
Total earnings for the year			$128,249 55
Total cash receipts reverting and transferred to the State Treasurer			$134,645 57
Accounts receivable outstanding Dec. 1, 1934		$38,475 92	
Accounts receivable outstanding Nov. 30, 1935		32,079 90	
Accounts receivable decreased			$6,396 02

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$6,607 53
Appropriation, current year	$282,245 00	
Increases as of June 1	4,310 00	
Supplementary budget	11,650 00	
Forty-eight hour law	3,990 00	
		$302,195 00
Total		$308,802 53
Expenditures as follows:		
Personal services	$179,910 30	
Food	38,762 21	
Medical and general care	11,182 74	
Farm	17,270 23	
Heat, light and power	16,260 60	
Garage, stable and grounds	2,069 79	
Travel, transportation and office expenses	3,999 34	
Religious instruction	1,410 00	
Clothing and materials	687 88	
Furnishings and household supplies	15,927 15	
Repairs ordinary	3,590 05	
Repairs and renewals	7,304 48	
Total maintenance expenditures		$298,374 77
Balance of maintenance appropriation, Nov. 30, 1935		$10,427 76
Estimated outstanding liabilities, Nov. 30, 1935		$6,159 28

SPECIAL APPROPRIATIONS

Balance December 1, 1934, brought forward		$5,410 01
Appropriations for current year		1,600 00
Total		$7,010 01
Expended during the year (see statement below)	$5,841 48	
Reverting to Treasury of Commonwealth	*	
(Star balances below that are reverting)		5,841 48
Balance November 30, 1935, carried to next year		$1,168 53

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Lamp T. Rm. & Equip. (Men's)	1934–162	$6,700	$53 35	$6,692 33	$7 67
Lamp T. Rm. & Equip. (Women's)	1934–162	6,700	33 52	6,698 70	1 30
X-ray machine and fluoroscope	1934–162	4,000	3,898 65	3,957 00	43 00
Fire protection	1935–249	1,600	1,331 11	1,331 11	268 89
P.W.A. Docket 1354 Mass. State Project H-1	1934	5,000	524 85	4,152 33	847 67
Totals		$24,000	$5,841 48	$22,831 47	$1,168 53

PER CAPITA

During the year the average number of patients has been		283 57
Total cost of maintenance	$298,374 77	
Equal to a weekly per capita cost of (52 weeks to year)	20 23	
Total receipts for the year	134,645 57	
Equal to a weekly per capita of	9 13	
Total net cost of maintenance for year	298,374 77	
	134,645 57	
(Total maintenance less total receipts)		$163,729 20
Net weekly per capita	11 10	

Respectfully submitted,

FLORENCE S. MONROE,
Treasurer.

Inventory, Lakeville State Sanatorium

GRAND SUMMARY SHEET

November 30, 1935

REAL ESTATE

Land, 251.61 acres	$18,065 00	
Buildings	521,095 45	
Betterments (additions and improvements)	167,603 57	
Total, Real Estate		$706,764 02

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$416 62	
Food	5,373 48	
Clothing and materials	5 48	
Furnishings and household supplies	1,816 73	
Medical and general care	2,167 90	
Heat, light and power	1,005 26	
Farm	446 87	
Garage, stable and grounds	236 31	
Repairs	2,059 81	
		$13,528 46

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$2,131 32	
Clothing and materials	816 26	
Furnishings and household supplies	52,790 38	
Medical and general care	15,800 00	
Heat, light and power	83 00	
Farm	27,576 80	
Garage, stable and grounds	3,271 20	
Repairs	2,419 95	
Total		$104,888 91

GRAND SUMMARY

Real Estate—Total	$706,764 02	
Personal Property—Undistributed Supplies, Total	13,528 46	
Personal Property—Distributed Supplies, Total	104,888 91	
		$825,181 39

NORTH READING STATE SANATORIUM

Resident Officers

Carl C. MacCorison, M.D., *Sanatorium Superintendent*
Earle C. Willoughby, M.D., *Assistant Superintendent*
Gerald H. Caron, M.D., *Assistant Physician*
Anna H. Maxwell, M.D., *Assistant Physician*
Rufus R. Little, M.D., *Assistant Physician*
James H. Powers, D.M.D., *Dentist*
Ethel M. Knight, *Institution Treasurer*
Ellen E. Bent, R.N., *Principal, School of Nursing*
Elizabeth Haslett, *Head Housekeeper*
Beulah F. Philbrook, *Head School Teacher*
J. Ellis Doucette, *Sanatorium Steward*
Daniel J. Scott, *Chief Power Plant Engineer*
Edward J. Leary, *Head Farmer*

Non-Resident Officers

Edward D. Churchill, M.D., *Consultant, Thoracic Surgeon*
Zabdiel B. Adams, M.D., *Consultant, Orthopedic Surgeon*
Halsey B. Loder, M.D., *Consultant, General Surgeon*
Harold L. Higgins, M.D., *Consultant, Pediatrician*
Thomas Odoneal, M.D., *Consultant, Ophthalmologist*
Charles W. DeWolfe, M.D., *Consultant, Laryngologist*
Austin W. Cheever, M.D., *Consultant, Dermatologist*

Report of the Superintendent

To Henry D. Chadwick, M.D., *Commissioner, Department of Public Health:*

I have the honor of submitting the twenty-fifth annual report of the North Reading State Sanatorium for the year ending November 30, 1935.

Financial Statement

During the year there has been expended for maintenance $242,178.67, a gross weekly per capita cost of $17.92. There has been $1,107.84 expended for special appropriations during 1935.

There has been collected from miscellaneous sources $73,391.79 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of $168,786.88. The net weekly per capita cost was 5.43. There has been collected from private funds $3,427; cities and towns $65,604; 23 cases (including 9 from the Division of Child Guardianship) were supported by private funds; 305 by cities and towns and 52 wholly by the State.

Population

There were 246 patients at the beginning of the fiscal year and 242 at the close. The largest number present at any one time was 278 and the smallest number present at any one time was 232. The daily average number of patients was 253.32 as against 259.9 last year. There were 210 patients admitted during the year, 18 less than last year.

There were 170 cases admitted from cities and towns of over 25,000 population, and 39 cases from cities and towns under 25,000 population. The average age of patients was 10.22, which is a little higher than last year.

Including deaths, there were 214 cases discharged, and the average duration of residence was 13.74 months. Of those discharged, 189 patients gained 2,830 lbs., an average gain of 14.97 lbs. per person.

Of the discharges, there were 15 apparently well, 131 arrested, 11 apparently arrested, 6 quiescent, 23 improved, 20 unimproved, 1 not considered. There were 7 deaths, 9 less than last year.

There were 92,467 hospital days.

Average number of officers and employees: Males, 57.15; Females, 77.90; total, 135.05.

MEDICAL REPORT

The medical treatment is practically unchanged except that we are resorting more and more to collapse therapy. Forty-four children in all received artificial pneumothorax during the year and also two discharged sanatorium patients. Eight hundred refills were given, thirty-one of these to ex-patients. Pneumolysis was performed on five patients and seven other patients had phrenic nerve operations. Three patients had lipiodol injections and bronchoscopic examinations. One patient had a thoracoplasty performed, and one girl had phrenic exeresis and pneumolysis done at the Massachusetts General Hospital. Lobectomy was performed on one patient.

During the year there was one case of mumps, one case of measles and one case of scarlet fever, which developed in children who had recently been admitted. Thanks to our system of isolation, there was no spread of the contagion.

Eight eye, ear, nose and throat clinics were held by Drs. Odoneal and DeWolfe. One hundred and fifty-two patients were referred to these clinics. Fifty-seven were fitted to glasses. Tonsils and adenoids were removed from thirteen patients.

Dr. Edward D. Churchill, consultant in chest surgery, held three clinics during the year and thirty-three patients were referred. Dr. Harold L. Higgins, consultant in pediatrics, held one clinic and six children were referred. Dr. Austin W. Cheever, consultant dermatologist, held one clinic and five patients were referred.

The consultation clinics were held as usual in Haverhill and Lawrence monthly during the year, and part of the time bi-monthly in Haverhill. The patients seen in these clinics have made greater use of our x-ray department than formerly.

The out-patient clinic has become one of the major activities of the sanatorium and shows substantial increase over the previous year. The figures for the consultation and out-patient clinics show in the following table:

	NEGATIVE		SUSPICIOUS		POSITIVE		
	New	Re-ex.	New	Re-ex.	New	Re-ex.	Total
Consultation .	0	0	165	98	14	18	295
Out-Patient . .	146	11	832	483	74	209	1,755

The school clinic, which was taken over in the beginning of the fall of 1934, is carried out in the following towns: Haverhill, Methuen, Lawrence, Lowell, Andover, North Reading, Wilmington, Tewksbury and Cambridge. Children in the sixth, ninth and eleventh grades were chosen. Occasionally the sixth grade was replaced with the seventh and a few other contact cases, as well as a few cases recommended by private physicians, were included.

The total number of schools visited was 117 with an enrollment of 19,252. Consents for Von Pirquet skin test were obtained for 10,273 or 53 per cent and this number was tested. Out of the number tested, 2,684, or 26 per cent, gave a positive reaction of the skin test; 2,741 were x-rayed. This number is a little higher than the number of reactors and is due to the fact that some pupils, who had a negative Von Pirquet test, were x-rayed on account of a long period of contact. Out of this number, 328, or 7 per cent, were found to have some x-ray findings. Eighty-two, or .0306 per cent, of the reactors were classified as having Childhood Type Tuberculosis; 7, or .0026 per cent, as having adult type tuberculosis. Three hundred and forty-one pupils were placed on the follow-up list.

In addition to the regular school clinic, we have taken up the follow-up Chadwick clinic in Reading, Wilmington and Tewksbury.

Dr. Olive A. Cooper, our consultant from the Department of Mental Diseases, together with her psychologist, Miss Culbert, has held ten clinics at the Sanatorium and examined twenty-two children.

INSTITUTION ACTIVITIES

The regular annual meeting of the Southern Middlesex Health Association was held at the sanatorium on January 15, 1935. Lectures and demonstrations on Childhood Type Tuberculosis were given to classes from the Harvard School of

Public Health, student nurses from the Malden Hospital training school, the New England Sanatorium training school for nurses, a group of school and public health nurses in the Southern Middlesex Association district, Dr. Harold L. Higgins' class from the Harvard Medical School, a group of students from the Lakeville State Sanatorium, a group of high school students from Haverhill, and classes of Dr. Robert H. Nichol.

In addition to these, members of the staff have given illustrated lectures at the Essex County Sanatorium, Wilmington Grange, North Reading Grange and in Lynn during Health Week.

IMPROVEMENTS AND CHANGES

The 25,000-gallon wood stave tank was replaced during the year.

Additional sprinkler heads have been installed in the attics of the East and West wards and pavilions; also the attic of the admitting and isolation building.

Our old laundry presses were replaced by new ones.

Oil burners were installed in the kitchen range and in the bakeshop oven.

Lightning rods were installed on the farmhouse and barn.

RECOMMENDATIONS

The additional employees added to our quota since the forty-eight hour law went into effect have made it necessary for us to provide larger and better accommodations for them.

A nurses' dormitory to house fourteen night workers is badly needed.

In order to enlarge our present employees' dining room, I would suggest that the storeroom be moved into a modern up-to-date storehouse, which should be located near our present vegetable cellar and storehouse.

The Engineering department has recommended additional appropriations for water supply and fire protection and sprinkler systems.

A new chlorinator is needed for the swimming pool.

Eight additional garages are needed for employees.

The extra-curricula room at the schoolhouse should be enlarged.

The hen houses and piggery should be shingled.

ACKNOWLEDGMENTS

I am deeply indebted to our clergymen for administering so faithfully to the spiritual needs of our children.

To the medical staff, nurses and employees, I wish to extend my appreciation for their loyal support and cooperation.

To the many friends of the institution, who have contributed to the children's happiness at Christmas and at other times during the year, I am grateful.

I wish to thank you and the other members of the Department for your support and cooperation.

LABORATORY REPORT

The following examinations were made in our laboratory:

Sputum examinations:	Positive	181	
	Negative	1,259	1,440
Urine analyses			1,635
White blood counts			818
Red blood counts			243
Differential blood counts			820
Hemoglobin estimations			745
Blood sedimentation tests			614
Babcock tests			52
Bacterial counts for milk			52
Throat culture			66
Other cultures and smears			114
Widal tests			118
Spinal fluids			2
Blood coagulation tests			7
Blood sugar tests			104

DENTAL REPORT

The following table is a summary of the work done this year:

Prophylactic treatments	523
Fillings (permanent teeth)	725
Fillings (temporary teeth)	393
Extractions (permanent teeth)	460
Extractions (temporary teeth)	885
Treatments	304
Restorations	4
X-rays	304
Irrigations	160
Visits	3,137
New patients	235

During the past year the following new equipment has been acquired: a new dental outfit consisting of a senior Harvard dental unit and a Harvard dental engine with rheostat and spray bottle outfit type, and the latest type Felton and Crane operating light. There has been a marked increase in the number of extractions done this year; also a marked increase in the need for hospital care for these patients. There was also a marked increase in the number of permanent fillings. We believe this to be due to improper diets, which result in caries; also because the School Clinics now care for children only up to the fourth grade. Thus, when children over ten years of age enter the sanatorium there is generally much dental work to be done.

It has been our policy to give every child discharged from the North Reading State Sanatorium a dental certificate. In order to receive this certificate, the child's mouth must have been in perfect condition for a period of at least six months.

There have been approximately 210 children admitted to the sanatorium who required dental attention.

Emergency dental treatment, either extraction or medication, has been given to about twenty-five of our employees.

SCHOOL REPORT

The work in the school department has continued much the same as last year. We have been confronted with the usual problems resulting from an ever-changing student body and the fact that these children come, not only from a large territorial area, but also from a variety of academic programs and perhaps a greater variety of social strata. The task of filling the individual needs with a limited teaching force and also a limited time element presents a serious problem. At no time are we able to accomplish all of the seemingly necessary duties.

The bedside instruction introduced early last year has proved to be an excellent stimulating measure. At the end of the first six months, the number of pupils had increased from eleven to thirty. The subjects offered include all of the elementary and grammar grade requirements, as well as many high school subjects. At present ninety-two separate lessons are being taught to thirty-three pupils in ten hours each week. During the past year, three of the bed patients completed their eighth grade requirements and got their diplomas. Four others, who entered school, were able to graduate either because of previous bedside instruction or because of summer school instruction. In order to carry on this important work, the extra-curricula activities of the older girls had to be discontinued. This extra-curricula work included the use of commercial patterns, dressmaking, plain and bound buttonholes, smocking and feather stitching, hooked and braided rugs, sealing wax and crepe paper crafts.

January 22, 1935, Miss Culbert gave the Stanford Achievement Tests to Grades three and four. The object of these tests was to compare the abilities of a group of sanatorium children with those of a group of the same grade in the public schools.

The tests revealed the rating of the sanatorium children to be lower than that of the children in the public schools. It was difficult to determine whether this retardation was due to actual mental defects or to illness which prevented normal progress. It would seem, however, that the retardation was due to illness since practically all of the over age children had been ill and forced to be out of school.

In May an exhibition of hand crafts was sponsored by the North Reading

Women's Club and the children of the sanatorium were invited to enter projects which had been completed in the extra-curricula department. Thirty-three articles, representing leather craft, metal craft, sealing wax craft, wood working, clay modeling, plain sewing, knitting, crocheting and art needlework were exhibited.

An improvement in subject matter has been made in the seventh and eighth grades; namely, the Rugg Social Science course has been introduced. This course combines and displaces the traditional history, geography, civics courses, thus producing a unified and comprehensive program. This improvement is in line with the most progressive pedagogical methods.

In a previous report it was stated that Miss Labonte was teaching a course in first year French. I am now able to report that the course is extended to second year French.

It is a pleasure to report that distinct progress has been made in the grading of our English course. Previously we have been alternating freshman and sophomore work in English, but now the course is graded systematically through the entire four years of high school.

The above named advances in subject matter and in teaching methods have caused heavy additions to the work and responsibility of the head teacher. It shall be our purpose in the future, as it has been in the past, to keep this school abreast of the best principles of educational methods. Every young person who goes out from this institution must be prepared, not only physically, but also intellectually, to meet the conditions of his new environment.

School Statistics

	Average Daily Attendance	Percent of Attendance	Total Enrollment
Kindergarten	17.90	90.7	44
Grade I	18.38	95.65	45
Grade II	19.11	95.68	48
Grades III and IV	32.94	96.	68
Grades V and VI	38.129	95.	48
Grades VII and VIII	33.09	96.24	74
High School	23.10	94.99	54
Entire school	182.56	94.89	382

Respectfully submitted,

CARL C. MACCORISON, M.D.
Superintendent.

TABLE I.—*Admissions and Discharges*

	Males	Females	Total
Patients in Sanatorium Dec. 1, 1934	126	120	246
Patients admitted from Dec. 1, 1934, to Nov. 30, 1935, incl.	109	101	210
Patients discharged from Dec. 1, 1934, to Nov. 30, 1935, incl.	98	116	214
Patients remaining in Sanatorium Nov. 30, 1935	137	105	242
Daily average number patients	132.25	121.07	253.32
Deaths (included in number discharged)	2	5	7

TABLE 2.—*Classification on Application Blanks and on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1934	1935	1934	1935	1934	1935
Minimal	38	47	23	18	10.09	8.57
Moderately advanced	28	30	11	10	4.82	4.76
Advanced	11	8	22	18	9.65	8.57
Unclassified	23	20	1	1	.44	.48
Childhood type tuberculosis	114	87	150	136	65.79	64.76
Malnutrition	0	0	10	8	4.39	3.80
No disease	0	0	8	6	3.50	2.25
Pleurisy with effusion	2	2	0	0	–	–
Bronchiectasis	0	1	0	2	–	.95
Empyema	0	0	0	1	–	.48
Lung abscess	0	0	0	1	–	.48
Pulmonary tuberculosis	2	1	0	0	–	–
Observation	8	8	0	0	–	–
Deferred	0	0	0	4	–	1.90
Glandular tuberculosis	0	1	0	0	–	–
Convalescing pneumonia	0	0	1	2	.44	.96
Bronchial asthma	0	0	0	1	–	.48
Tuberculous pneumonia	1	0	0	0	–	–
Tuberculosis of peritoneum	1	0	1	0	.44	–
Pyelitis	0	0	1	0	.44	–
Acute gastro-enteritis	0	1	0	1	–	.48
Chronic otitis media	0	0	0	1	–	.48
Miliary tuberculosis	0	2	0	0	–	–
Multiple ulcers in right cornea	0	1	0	0	–	–
Pleural (?)	0	1	0	0	–	–
	228	210	228	210	–	–

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single	109	101	210
Total	109	101	210

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Total	Per Cent
Under 5 years	12	10	22	10.48
5 to 9 years	36	24	60	28.58
10 to 14 years	47	49	96	45.71
15 to 19 years	14	18	32	15.23
20 years and over	0	0	0	–
Average age	9.99	10.19	10.22	–
Total	109	101	210	100.00

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACE OF NATIVITY	MALES			FEMALES			TOTAL		
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:									
Massachusetts	95	42	53	85	36	32	180	78	85
Other New England States	8	12	10	4	8	10	12	20	20
Other States	5	2	3	4	5	5	9	7	8
	108	56	66	93	49	47	201	105	113
Other Countries:									
Albania	0	0	0	0	1	1	0	1	1
Armenia	0	1	0	0	1	1	0	2	1
Azores	0	1	1	0	0	1	0	1	2
Canada	1	10	11	4	11	10	5	21	21
Cape Verde	0	2	1	0	0	0	0	2	1
England	0	1	0	0	0	0	0	1	0
Finland	0	0	0	0	1	1	0	1	1
Germany	0	0	0	0	1	0	0	1	0
Greece	0	2	1	0	3	2	0	5	3
Ireland	0	7	7	0	5	13	0	12	20
Italy	0	12	8	1	13	13	1	25	21
Jamaica	0	0	0	0	1	0	0	1	0
Latvia	0	1	0	0	0	0	0	1	0
Lithuania	0	2	2	0	2	2	0	4	4
Newfoundland	0	3	1	0	2	1	0	5	2
Poland	0	2	3	0	2	2	0	4	5
Russia	0	3	4	0	1	1	0	4	5
Scotland	0	1	1	2	6	3	2	7	4
Sweden	0	2	0	0	0	0	0	2	0
Syria	0	0	1	0	0	0	0	0	1
Turkey	0	0	0	0	0	1	0	0	1
West Indies	0	1	1	1	1	1	1	2	2
Unknown	0	2	1	0	1	1	0	3	2
Total Foreign	1	53	43	8	52	54	9	105	97
Grand Total	109	109	109	101	101	101	210	210	210

TABLE 6.—*Residence of Patients Admitted*

Arlington	4
Ashland	1
Athol	1
Belmont	1
Billerica	1
Boston	56
Brookline	4
Cambridge	18
Chelsea	5
Cohasset	1
Concord	2
Danvers	1
Everett	7
Gloucester	4
Haverhill	8
Lawrence	12
Lexington	1
Littleton	1
Lowell	2
Lynn	7
Malden	9
Mansfield	1
Mashpee	1
Methuen	3
Natick	2
Newburyport	3
Newton	4
Peabody	1
Quincy	9
Reading	5
Revere	4
Salem	3
Saugus	1
Somerville	14
Stoneham	1
Stoughton	1
Waltham	1
Watertown	3
Wellesley	1
Westfield	2
Weymouth	1
Wilmington	1
Winchester	1
Worcester	1
Total	210

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Total	Percentage
Childhood tuberculosis	78	58	136	64.76
Minimal	10	8	18	8.57
Moderately advanced	2	8	10	4.76
Advanced	6	12	18	8.57
Malnutrition	2	6	8	3.80
No disease	3	3	6	2.85
Convalescing pneumonia	1	1	2	.96
Bronchial asthma	1	0	1	.48
Gastro-enteritis	1	0	1	.48
Chronic otitis media	1	0	1	.48
Lung abscess	0	1	1	.48
Empyema	0	1	1	.48
Bronchiectasis	0	2	2	.95
Unclassified	1	0	1	.48
Deferred	3	1	4	1.90
Total	109	101	210	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Total	Percentage
Apparently well	6	9	15	7.01
Arrested	62	69	131	61.21
Apparently arrested	5	6	11	5.14
Quiescent	5	1	6	2.80
Improved	11	12	23	10.75
Unimproved	6	14	20	9.35
Died	2	5	7	3.27
Not considered	1	0	1	.47
Total	98	116	214	100.00

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Total	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Total
Under 1 month	0	0	0	2	0	2
1 to 2 months	0	0	0	0	1	1
2 to 3 months	1	0	1	0	0	0
3 to 4 months	0	0	0	0	0	0
4 to 5 months	0	0	0	0	0	0
5 to 6 months	0	0	0	0	1	1
6 to 7 months	0	0	0	0	0	0
7 to 8 months	0	0	0	0	0	0
8 to 9 months	0	0	0	0	0	0
9 to 10 months	0	0	0	0	0	0
10 to 11 months	1	0	1	0	1	1
11 to 12 months	0	0	0	0	0	0
12 to 18 months	0	0	0	0	1	1
18 to 24 months	0	1	1	0	0	0
Over 2 years	0	4	4	0	1	1
Total	2	5	7	2	5	7

TABLE 10.—*Cause of Death*

	Males	Females	Total
Tuberculosis of lungs	2	5	7
Total	2	5	7

Financial Report, North Reading State Sanatorium, 1935

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1935.

STATEMENT OF EARNINGS

Board of patients:			
Private	$3,427 00		
Cities and towns	65,604 00		
		$69,031 00	
Personal services:			
Reimbursement from Board of Retirement		$85 00	
Sales:			
Food	$2 87		
Clothing and materials	171 16		
Furniture and household supplies	68 53		
Medical and general care	61 44		
Heat, light and power	4 75		
Farm	35 00		
Garage, stable and grounds	65 76		
Repairs, ordinary	40 90		
Miscellaneous junk	116 00		
Total sales		$566 41	
Miscellaneous:			
Garages	$322 25		
Total, miscellaneous		$322 25	
Total earnings for the year			$70,004 66
Total cash receipts reverting and transferred to the State Treasurer			$73,391 79
Accounts receivable outstanding Dec. 1, 1934		$20,826 50	
Accounts receivable outstanding Nov. 30, 1935		17,439 37	
Accounts receivable decreased			3,387 13

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$5,389 35
Appropriation, current year	$250,429 97	
		250,429 97
Total		$255,819 32
Expenditures as follows:		
Personal services	$154,116 39	
Food	40,499 30	
Medical and general care	9,837 25	
Farm	2,925 17	
Heat, light and power	13,783 29	
Garage, stable and grounds	2,187 89	
Travel, transportation and office expenses	2,931 78	
Religious instruction	1,599 72	
Clothing and materials	1,876 22	
Furnishings and household supplies	5,024 47	
Repairs, ordinary	2,953 37	
Repairs and renewals	4,443 82	
Total maintenance expenditures		$242,178 67
Balance of maintenance appropriation, Nov. 30, 1935		$13,640 65
Estimated outstanding liabilities, Nov. 30, 1935		$5,567 52

SPECIAL APPROPRIATIONS

Balance Dec. 1, 1934, brought forward		–
Appropriations for current year		$3,535 00
Total		$3,535 00
Expended during the year (see statement below)	$1,107 84	
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*–	1,107 84
Balance Nov. 30, 1935, carried to next year		$2,427 16

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Improvement Water Supply	249–1935	$1,500 00	–	–	$1,500 00
Fire Protection and Sprinklers	249–1935	2,000 00	$1,107 84	$1,107 84	892 16
Purchase of Land	497–1935	35 00	–	–	35 00
					$2,427 16

PER CAPITA

During the year the average number of patients has been		259.9
Total cost of maintenance	$242,178 67	
Equal to a weekly per capita cost of (52 weeks to year)	17.92	
Total receipts for the year	$73,391 79	
Equal to a weekly per capita of	5 43	
Total net cost of maintenance for year (total maintenance less total receipts)		$168,786 88
Net weekly per capita	12 49	

Respectfully submitted,

ETHEL M. KNIGHT,
Treasurer.

Inventory, North Reading State Sanatorium

GRAND SUMMARY SHEET

November 30, 1935

REAL ESTATE

Land, 112.81 acres	$11,143 00
Buildings	622,557 39
Betterments (additions and improvements)	139,204 30
Total, Real Estate	$772,904 69

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$105 64
Food	4,636 53
Clothing and materials	3,144 12
Furnishings and household supplies	2,300 12
Medical and general care	581 51
Heat, light and power	1,471 51
Farm	285 04
Garage, stable and grounds	101 26
Repairs	47 32
	$12,673 05

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$4,609 80
Clothing and materials	3,940 70
Furnishings and household supplies	74,334 65
Medical and general care	31,137 60
Heat, light and power	74 40
Farm	7,986 67
Garage, stable and grounds	6,583 92
Repairs	8,117 34
	$136,785 08

GRAND SUMMARY

Real Estate—Total	$772,904 69
Personal Property—Undistributed Supplies, Total	12,673 05
Personal Property—Distributed Supplies, Total	136,785 08
	$922,362 82

RUTLAND STATE SANATORIUM

RESIDENT OFFICERS

ERNEST B. EMERSON, M.D., *Superintendent.*
PAUL DUFAULT, M.D., *Assistant Superintendent.*
ARMAND LAROCHE, M.D., *Senior Physician.*
GABRIEL NADEAU, M.D., *Senior Physician.*
CHARLES K. MCCARTHY, M.D., *Assistant Physician.*
ISRAEL KAHALAS, M.D., *Assistant Physician.*
RUBY DELPHINA MCCARTHY, M.D., *Assistant Physician.*
GULLI LINDH MULLER, M.D., *Assistant Physician (Pathologist).*
PHILIP E. ZANFAGNA, M.D., *Assistant Physician.*
DELYA E. NARDI, R.N., *Principal of the School of Nursing.*
RENA BLANCHE NAUSS, R.N., *Assistant Principal of the School of Nursing.*
MARGUERITE MCNAMARA, *Dietition.*
PHILIP G. ZARAMBA, *Steward.*
MARY A. BOYLE, *Institution Treasurer.*
HARRY U. WENDELL, *Chief Power Plant Engineer.*
JOSEPH A. CARROLL, *Head Farmer.*
NORA G. O'CONNELL, *Head Housekeeper.*

NON-RESIDENT OFFICERS

FRANK H. WASHBURN, M.D., *Senior Physician.*
EDWARD D. CHURCHILL, M.D., *Senior Physician.*
G. ARNOLD RICE, M.D., *Senior Physician.*
SHIELDS WARREN, M.D., *Senior Physician (Pathologist).*
WILLIAM J. O'CONNOR, D.M.D., *Dentist.*
ROSCOE W. MYERS, M.D., *Ophthalmologist.*

Report of the Superintendent

TO DR. HENRY D. CHADWICK, *Commissioner, Department of Public Health:*

I have the honor to submit the thirty-ninth annual report of the Rutland State Sanatorium for the year ending November 30, 1935.

FINANCIAL STATEMENT

During the year there has been expended $327,444.68 for maintenance, a net weekly per capita cost of 8.21. This is an increase of $54,262.48 over the expenditures for 1934, allocated approximately as follows: Personal Services, $23,090.19, due to step increases June 1st and to increased personnel of 48-hour week; Food, $5,950.57, an increase of nearly 8 per cent in the cost of raw foods; Medical and General Care, $7,492.71, due to the hospitalization of surgical cases at the Massachusetts General Hospital; Farm, $5,949.15, purchase of live stock and rise in grains; Heat and other Plant Operation, $5,922.87; Repairs and Renewals, $5,781.25. There has been expended from Special Appropriations authorized by Chapter 162, Acts of 1934, Sprinklers, $3,420.82; Sewer Connections to Metropolitan District, $60,000; from Emergency Public Works Commission, Construction Massachusetts State Projects, Docket 1354, H-2, Reconstruction Sewer Lines, $946.10; Docket 2275, H-3, New Boilers, $12,795.04; from Special Appropriations authorized by Chapter 249, Acts 1935, Improvements Water Supply Mains, $3,898.70. All of the foregoing projects have been completed. From Special Appropriations authorized by Chapter 249, Acts 1935, Reconstruction of Road, the contract has been let and there has been expended $147.

There has been collected from miscellaneous sources $153,662.64, a decrease of $38,433.07 under the collections of 1934, in which year there were extraordinary receipts from the Tubercular Hospital District of Chelsea, Revere and Winthrop. Deducting the total collections from the gross maintenance expenses leaves a net expense of $173,782.04, a net weekly per capita cost of $9.29. There has been collected from private sources $28,885.50; from cities and towns $62,721.89; from the Tubercular Hospital District of Chelsea, Revere and Winthrop $42,142.46 and by the Attorney General $42.00.

Seventy-eight cases were supported wholly or in part from private funds; one hundred and fourteen cases by cities and towns; forty-eight cases by the Tubercular Hospital District of Chelsea, Revere and Winthrop; seventy-six cases wholly by the State. There were fifty cases on which settlement had not been determined.

POPULATION

There were 357 patients in the sanatorium at the beginning of the year and 366 at the close. The largest number present at one time was 371 and the smallest 349. The daily average number of patients was 359.52, an increase of 7.44 over last year. There were 398 patients admitted during the year, 3 more than last year; 26 minimal, 175 moderately advanced, 170 far advanced, 7 unclassified, 2 childhood type, 1 childhood type and cervical adenitis, 2 bronchiectasis, 7 pleurisy of unknown origin, 1 tuberculous pleurisy, 1 lung abscess, 1 bronchial asthma and chronic sinusitis, 1 hemiplegia and probable cerebral hemorrhage, 3 spontaneous pneumothorax, and 1 Hodgkin's disease. There were 292 admitted from cities and towns of over 25,000 population and 106 from cities and towns under 25,000 population. The average age of patients admitted was 31.87, an increase of .06. Including deaths there were 389 patients discharged, 9 less than last year. The average duration of residence was 354 days, 34 less than last year. Of those discharged, 239 gained 2,563¼ pounds, an average gain of 10.72 pounds per person. Of the discharged, there were 3 arrested cases, 3 more than last year; 11 apparently arrested cases, 3 less than last year; 145 quiescent cases, 20 less than last year; 82 improved; 68 unimproved; 1 childhood type healed; 2 bronchiectasis; 1 lung abscess healed; 10 not considered, the duration of treatment being less than one month. There were 5 discharged non-tuberculous. There were 61 deaths, 3 less than last year. There were 131,225 days of treatment, 2,715 days more than last year.

Average number of employees and officers during the year: males, 120.72; females, 87.24; total, 207.96.

Further statistical details are shown in the tables which are a part of this report.

MEDICAL REPORT

The papers published by the staff during the year will be found on page 22.

Papers not yet published:

"Blood Studies in Surgical Tuberculosis,"—Gulli Lindh Muller, M.D., read at the October Meeting of the Trudeau Society.

"Value of Blood Studies in the Selection of Cases of Pulmonary Tuberculosis for Thoracoplasty,"—Gulli Lindh Muller, M.D. Read at the Fall Meeting of the American Sanatorium Association, Eastern Section.

"Some Considerations on the Results of Intrapleural Pneumolysis,"—Armand Laroche, M.D., and Paul Dufault, M.D.

"Bronchoscopy and the Differential Diagnosis between Tuberculosis, Lung Abscess and Bronchiectasis,"—G. Arnold Rice, M.D. Read at the annual meeting of the Massachusetts Medical Society, June 5, 1935.

"Pneumolysis Failures,"—Paul Dufault, M.D. Read at the October Meeting of the Trudeau Society.

A moving picture "The Sanatorium," by Dr. Dufault, has had several showings before lay organizations and medical societies.

The consultation clinics held in Athol, Gardner, Southbridge, Milford and the out-patient clinic at the sanatorium again show not only an increase in the number of persons examined but also 38 more physicians referring cases.

There were 167 persons examined two to four times. The diagnosis of tuberculosis is oftentimes impossible on a single examination; even after a considerable period of observation there may be an element of doubt. During such a period of observation we are merely waiting for the disease to progress and doing little or nothing at a time when it is most amenable to treatment. I believe the law should be amended to permit the admission of certain cases for observation and treatment pending a diagnosis. At present the patient is denied the opportunity until he can be labeled tuberculous.

The tables show in detail the medical activities and the general trend in the treatment of tuberculosis: laboratory, instruments of precision, and remedial measures, little dreamed of when, by proclamation of Governor Roger Wolcott, the first state sanatorium in America opened its doors October 1, 1898, for the treatment of tuberculosis. Hospital ward facilities, however, for meeting present-day treatment requirements have not kept the pace. This matter is further considered under recommendations.

INSTITUTION ACTIVITIES

The Training School is in its twenty-eighth year.

Lectures and demonstrations have been given by the medical staff and special instruction by the following: Doctor Edward Crane, assistant surgeon, Holden District Hospital, Surgery; Doctor N. A. Nelson, Gonorrhea and Syphilis; Mrs. Helen Hackett, R.N., Consultant, Public Health Nursing; Miss Beinert, Consultant in Nutrition; Doctor G. Arnold Rice, Special Senses; Doctor William J. O'Connor, Oral Hygiene; Mr. Francis H. Kingsbury, Mr. Arthur V. Harrington, Mr. Walter E. Merrill, Mr. Willard S. Little, of the Division of Sanitary Engineering.

The hospital affiliations are:

Cooley-Dickinson Hospital	9 months
Boston City Hospital	1 year
Boston Floating Hospital	3 months
North Reading State Sanatorium	2 months

Graduation exercises were held October 19, 1935. The address was given by Doctor Alton S. Pope, Director, Division of Tuberculosis, State House, Boston, Massachusetts.

The following were awarded diplomas:

Blanche Zelia Blanchette
Fabiola Lydie Lomme
Beatrice Aubrey Mellon
Mary Ann O'Neil
Mary Virginia Proal
Elizabeth Ann Farrell

The following have been awarded diplomas after completing the six months' postgraduate course: Margaret Mary Ryan, a graduate of the Worcester State Hospital, Worcester, Massachusetts; Jennie Josephine Winters, a graduate of the Worcester City Hospital, Worcester, Massachusetts; Alonna Helena Tuaog, a graduate of the Lowell General Hospital, Lowell, Massachusetts; Catherine Veronica Hardiman and Anna Gertrude Dennehy, graduates of the Rutland State Sanatorium Training School for Nurses, Rutland, Massachusetts; Helen Louise Wilkins, a graduate of the Presque Isle General Hospital, Presque Isle, Maine.

There are 32 student nurses: 15 seniors, 6 juniors, 7 preliminaries and 4 post-graduates, taking a six-months' course in tuberculosis.

The scientific programs were presented by the staff at the meetings of the Worcester District Medical Society and the Trudeau Society held at the sanatorium.

Personnel Changes

The following new positions were authorized this year: One non-resident ophthalmologist, one assistant physician, one head nurse, two attendant nurses, one laboratory technician (x-ray) and one junior clerk and stenographer in addition to the twenty positions required to comply with the 48 hour law, making a total increase of 27 employees. Doctor Roscoe W. Myers was appointed non-resident ophthalmologist and Doctor Philip E. Zanfagna, assistant physician.

Recommendations

I submit the following recommendations:

An appropriation of $375,000 for the construction of two wards to accommodate 162 patients, as the first step towards the rebuilding of the entire institution during the next three years.

In explanation of this seemingly extravagant idea, I wish to say that the Rutland State Sanatorium was the first state sanatorium in America for the treatment of tuberculosis. The construction is of the flimsiest type consisting for the most part of frame construction, stucco finish, wooden floors and obsolete plumbing, connected by corridors approximating three thousand feet in length. These buildings served their purpose at a time when all that was considered necessary for the treatment of tuberculosis was fresh air and super-feeding. All this has changed. The proper hospitalization today of the tuberculous patient is not far removed from that of any type of case requiring medical and surgical measures. Approximately two-thirds of our patients are confined to bed and from 75 to 80 per cent are under some form of surgical treatment. Four times as many single rooms should be provided as are available in the present buildings. This lack of single rooms makes it impossible to give the care required in many instances.

Furthermore, the present institution is a tremendous fire hazard not alone to life from fire directly but from the exposure and suffering should a conflagration occur on a winter's night, with no place of refuge.

An appropriation of $140,000 for the erection of two buildings for the housing of employees. At the present time we have two employees in a room large enough for one only, three in a room and in one instance six in an open dormitory. Others are living on the outside.

An appropriation of $45,500 for the installation of two generators. The present contract for electric current expires in January, 1937. Our costs for fuel are about the same as when we were generating current. There has been, however, some saving in labor costs, inasmuch as we are getting along with three less engineers. With the oil burning equipment now installed I believe we can replace three firemen by three engineers at an additional cost of $700 more or less a year and generate our own current. With the oil burning equipment an engineer on watch can handle both the engines and the boilers. During eight months of the year exhaust steam will be used for heating. I have figured approximately $2,000 a year saving and, judging from past experience, a better service than we have had under the present contract.

An appropriation of $13,270 for the erection of a 150,000-gallon auxiliary storage tank for fire protection.

An appropriation of $7,190 for further fire protection to the farm buildings.

An appropriation of $1,455 for additional lightning protection.

Under repairs and renewals the following items are somewhat contingent on the policy of reconstruction:

Gravel roofs	$1,350
Plumbing	780
New floors	2,460

ACKNOWLEDGMENTS

In closing, may I pay tribute to those who have, as in the past, brought solace and spiritual comfort to all—a service not measured by the dollar sign:

The Rev. Father McNamara, the Rev. Father Sullivan, the Rev. Robert French, the Rev. Father Smith, and Rabbi Zeldner.

I am deeply grateful for the cooperation and loyalty of the medical staff, nurses and employees who have made it possible to "carry on" another year.

Again, may I express my appreciation of your confidence, support and counsel.

Respectfully,

ERNEST B. EMERSON,
Superintendent.

SURGICAL REPORT

The following is a list of the surgical operations performed at the sanatorium:

Appendectomy	23
Biopsy	3
Bronchoscopy	29
Cystoscopy	9
Dilatation and curettage	1
Dilatation and curettage and insertion of Chamber's Pessary	1
Herniotomy	1
Oophorectomy	2
Phrenicectomy	5
Phrenic interruption	40
Intrapleural pneumolysis	23
Scalenotomy	6
Salpingo-oophorectomy	2
Thoracoscopy	1
Tonsillectomy	21
Webster-Baldy operation	1
Operation for pilonidal sinus	1
Hemithyroidectomy, right	1
Thoracotomy, right	1
Closure of duodenal perforation	1
Excision of sebaceous cyst of scrotum	1
Incision of portion of rib and curettage of sinus	1
Incision and drainage of acute peritonitis	1
Right lumbar exploration to free pelvis	1
Excision of sebaceous cyst to the mandible	1
Total	177

Oleothorax treatments	84
Artificial pneumothorax treatments	6,440
Aspirations (chest)	217

There were 43 thoracoplasties performed at the Massachusetts General Hospital, 14 more than last year.

LABORATORY

Urine examinations:

Routine chemical	918
Microscopic	919
Qualitative sugar determination	1,891
Acetone	1,848
Benzidin test for occult blood	27
Mosenthal test	4
Total chloride	4
Kidney function (P.S.P.) test	9
Bile	2

Sputum examinations:	
Routine for tubercle bacilli	6,312
Concentration method for tubercle bacilli	436
Blood examination:	
Culture	3
Red cell count	810
White cell count	2,289
Differential count with modified Schilling index	2,271
Hemoglobin determination (Hellige)	2,270
Erythrocyte sedimentation test	2,728
Hematocrit	2,676
Icterus index	808
Reticulocyte count	2
Coagulation time	120
Bleeding time	1
Van den Bergh test	3
Sugar (Folin's method)	113
Non-protein nitrogen	5
Serum calcium	1
Widal reaction	144
Feces examinations:	
Benzidin test for occult blood	5
Ova, tubercle bacilli, etc.	42
Pleural fluid examinations:	
Culture	259
Smear	124
Cell count	3
Spinal fluid examinations:	
Cell count	11
Chemical	9
Culture	6
Smear	6
Stomach contents examination:	
Acidity	1
Concentration for tubercle bacilli	2
Milk examination:	
Bacteria count	3
Percentage of fat	17
Total solids	10
Miscellaneous examinations:	
Culture	59
Smear	151
Guinea pig inoculations and autopsies	71
Preparation of microscopical sections	1,075
Preparation of autogenous vaccine	1
Total number of examinations (increase over 1934, 1,796)	28,469
Specimens sent from laboratory to Boston:	
Cultures from urine and feces for B typhosus	106
Blood for Hinton and Wassermann tests	384
Spinal fluid for Wassermann and Gold Sol tests	7
Lectures in bacteriology to nurses' training school	24

Of the total number of patients in sanatorium November 30, 1935 (366), 79.8 per cent have had a positive sputum; in 16.3 per cent tubercle bacilli were not found; 3.9 per cent reported no sputum.

Autopsies, 26 (42.6%). Two autopsies were done at another sanatorium, work completed in our laboratory.

Surgical specimens, 59.

Smallpox vaccinations, 239. Typhoid and Paratyphoid A and B inoculations, 227.

X-ray plates of chest, stomach, etc., 2,490; dental X-rays, 385. Total, 2,875.

The following tables indicate the work of the consultation service, clinics, out-patient and others:

Number of patients examined at the Gardner, Milford, Southbridge and Athol clinics, 899.

Diagnosis:

Pulmonary tuberculosis	48
Pulmonary tuberculosis, re-examination	13
Non-tuberculous	297
Non-tuberculous—re-examination	3
Observation	408
Observation, re-examination	56
Childhood type	18
Childhood type, re-examination	12
Healed childhood type	1
Childhood type and pleurisy	2
Bronchiectasis	10
Lung abscess	1
Healed lung abscess	1
Pleurisy (unknown origin)	1
	871

Consultation cases to the number of 871 (121 more than last year) were referred for 1,019 examinations (141 more than last year), and 28 ex-patients (2 more than last year) reported for 36 follow-up examinations (1 more than last year), making a total of 1,055 examinations (142 more than last year) at the consultation clinics.

Number of patients examined once, 747; twice, 104; three times, 16; four times, 4.

Number of ex-patients examined once, 21; twice, 6; three times, 1.

Number of physicians referring patients 105, the same as last year.

There were 5 patients admitted to the sanatorium following examinations at the consultation clinics.

Sanatorium Out-Patient Clinic:

Patients referred by physicians	343
Patients examined at own request	84
	427
Ex-patients examined at own request	203
Total	630

Diagnosis:

Pulmonary tuberculosis	47
Pulmonary tuberculosis, re-examination	16
Non-tuberculous	235
Observation	100
Observation, re-examination	3
Bronchiectasis	6
Pulmonary tuberculosis and bronchiectasis	1
Pleurisy (unknown origin)	3
Tuberculous pleurisy	2
Glandular tuberculosis	1
Childhood type	8
Childhood type, re-examination	4
Childhood type and pleurisy	1
Total	427

This year 427 patients (23 more than last year) reported for 450 examinations (25 more than last year), and 203 ex-patients (9 more than last year) reported for 256 examinations (41 more than last year), making a total of 706 examinations at the sanatorium.

Number of patients examined once, 405; twice, 21; three times, 1.

Number of ex-patients examined once, 160; twice, 35; three times, 6; four times, 2.

Number of physicians referring patients to the sanatorium 160, 38 more than last year.

There were 19 patients admitted to the sanatorium following examinations at the sanatorium.

School clinics were held in Athol and Fitchburg and 379 children were examined.

Diagnosis:

Non-tuberculous	348
Observation	31
Total	379

The total of all examinations made during the year exclusive of routine work was 2,140, 587 more than last year.

DENTAL REPORT

The following is a summary of the dental work done during the year:

Examinations	322	Gangrene stomatitis	2
New patients	246	Ankylosis	3
Office visits	2,668	Vulcanite stomatitis	2
Extractions	262	Cellulitis	1
Extractions (impacted teeth)	12	Removal of bony process	6
Fillings	524	Vincent's disease	19
Prophylaxis	124	Impressions	57
Treatments	1,182	Denture	1
Pyorrhea cases	40	Restorations	18
Gingivitis cases	206	Repairs to plates	71
Stomatitis cases	15	Plates fitted	16
Exostosis cases	6	Bridges removed	2
Hypertrophy of gum	7	Repairs to bridges	11
Osteomyelitis cases	3	Crowns removed	2
Trismus	2	Repairs to Davis Crown	1
Epulis tumor	1	Mouth washes	367
Pericementitis	7	X-Rays	385

Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Total
Patients in sanatorium November 30, 1934	172	185	357
Patients admitted December 1, 1934, to November 30, 1935, inclusive	220	178	398
Patients discharged December 1, 1934, to November 30, 1935, inclusive	207	182	389
Patients remaining in Sanatorium November 30, 1935	185	181	366
Daily average number of patients	178.30	181.22	359.52
Deaths (included in number discharged)	34	27	61

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Percentage	
	1934	1935	1934	1935	1934	1935
Minimal	55	83	31	26	7.85	6.53
Moderately advanced	216	191	128	175	32.41	43.97
Far advanced	83	87	203	170	51.40	42.72
Unclassified	36	37	15	7	3.80	1.76
Childhood type	5	–	4	2	1.02	.50
Childhood type and cervical adenitis	–	–	–	1	–	.25
Chronic bronchiectasis	–	–	3	2	.76	.50
Lung abscess	–	–	3	1	.76	.25
Multiple lung abscesses and empyema	–	–	1	–	.25	–
Empyema	–	–	1	–	.25	–
Pleurisy and anaemia	–	–	1	–	.25	–
Pleurisy (unknown origin)	–	–	2	7	.50	1.76
Tuberculous pleurisy	–	–	–	1	–	.25
Bronchial asthma	–	–	2	–	.50	–
Bronchial asthma and chronic sinusitis	–	–	–	1	–	.25
Spontaneous pneumothorax	–	–	–	3	–	.76
Cancer of lung	–	–	1	–	.25	–
Hemiplegia and probable cerebral hemorrhage	–	–	–	1	–	.25
Hodgkin's disease	–	–	–	1	–	.25
	395	398	395	398	–	–

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single	103	99	202
Married	110	70	180
Widowed	4	7	11
Divorced	3	2	5
	220	178	398

TABLE 4.—*Ages of Patients Admitted*

	Males	Females	Total	Percentage
Under 20 years	12	14	26	6.53
20 to 29 years	83	97	180	45.22
30 to 39 years	62	47	109	27.38
40 to 49 years	37	13	50	12.56
50 to 59 years	20	4	24	6.04
60 to 69 years	5	3	8	2.02
70 and over	1	–	1	.25
Average age	33.99	29.75	31.87	–
	220	178	398	–

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	119	40	39	107	30	29	226	70	68
Other New England States	17	11	14	20	17	18	37	28	32
Other States	17	19	18	10	17	8	27	36	26
Total Native	153	70	71	137	64	55	290	134	126
Other Countries (26)									
Total Foreign	67	149	147	41	109	118	108	258	265
Unknown	–	1	2	–	5	5	–	6	7
Grand Totals	220	220	220	178	178	178	398	398	398

TABLE 6.—*Residences of Patients Admitted*

Place	No.	Place	No.	Place	No.	Place	No.
Adams	1	Fall River	1	Montague	2	Rutland	1
Arlington	6	Falmouth	1	Natick	4	Sharon	1
Athol	3	Fitchburg	1	Needham	1	Somerville	17
Ayer	1	Framingham	3	New Bedford	2	South Hadley	1
Barre	1	Gardner	3	New Salem	1	Springfield	30
Belmont	2	Gloucester	1	Newburyport	1	Stoneham	2
Billerica	1	Great Barrington	2	Newton	11	Townsend	1
Boston	82	Greenfield	1	Norfolk	1	Wakefield	3
Braintree	1	Holden	1	North Adams	3	Waltham	6
Brookline	4	Holyoke	23	North Reading	2	Watertown	13
Burlington	4	Lawrence	1	Northampton	4	Westfield	3
Cambridge	13	Lee	1	Norwood	1	Weymouth	2
Chelmsford	2	Leominster	2	Palmer	4	Wilmington	1
Chelsea	19	Lowell	7	Pittsfield	3	Winchester	2
Chicopee	7	Ludlow	4	Pleasant Valley, Conn.	1	Winthrop	7
Dedham	1	Lynn	2	Quincy	1	Woburn	3
Deerfield	2	Malden	6	Reading	4	Worcester	7
Easthampton	2	Marlboro	1	Revere	19	Total	398
East Longmeadow	1	Maynard	2	Rockland	1		
Everett	10	Medford	6				

TABLE 7.—*Stage of Disease at Admission*

	Males	Females	Totals	Percentages
Minimal	13	13	26	6.53
Moderately advanced	90	85	175	43.97
Far advanced	98	72	170	42.72
Unclassified	4	3	7	1.76
Childhood type	1	1	2	.50
Childhood type and cervical adenitis	–	1	1	.25
Lung abscess	1	–	1	.25
Hemiplegia and probable cerebral hemorrhage	1	–	1	.25
Bronchial asthma and chronic sinusitis	–	1	1	.25
Pleurisy (unknown origin)	5	2	7	1.76
Tuberculous pleurisy	1	–	1	.25
Spontaneous pneumothorax	3	–	3	.76
Hodgkin's disease	1	–	1	.25
Bronchiectasis	2	–	2	.50
	220	178	398	–

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Arrested	1	2	3	.77
Apparently arrested	5	6	11	2.83
Quiescent	76	69	145	37.27
Improved	52	30	82	21.08
Unimproved	29	39	68	17.48
Childhood type healed	1	–	1	.26
Non-tuberculous	3	2	5	1.28
Bronchiectasis	2	–	2	.52
Lung abscess	1	–	1	.26
Not considered	3	7	10	2.57
Dead	34	27	61	15.68
	207	182	389	–

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month	–	–	–	6	1	7
1 to 2 months	–	–	–	3	1	4
2 to 3 months	1	–	1	4	1	5
3 to 4 months	–	–	–	1	2	3
4 to 5 months	1	–	1	2	2	4
5 to 6 months	–	–	–	–	–	–
6 to 7 months	2	1	3	3	3	6
7 to 8 months	1	–	1	2	–	2
8 to 9 months	2	–	2	2	–	2
9 to 10 months	–	1	1	1	1	2
10 to 12 months	1	–	1	1	3	4
12 to 18 months	5	10	15	2	3	5
18 to 24 months	4	3	7	4	5	9
Over 2 years	17	12	29	3	5	8
	34	27	61	34	27	61

TABLE 10.—*Cause of Death*

	Males	Females	Totals
Pulmonary tuberculosis	31	21	52
Pulmonary tuberculosis and bronchopleural fistula	1	–	1
Pulmonary tuberculosis and tuberculous enteritis	1	3	4
Pulmonary tuberculosis and tuberculosis of kidneys	1	–	1
Pulmonary tuberculosis and empyema	–	3	3
	34	27	61

Financial Report, Rutland State Sanatorium, 1935

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1935.

STATEMENT OF EARNINGS

Board of patients:			
Private	$28,885 50		
Cities and towns	62,721 89		
Chelsea, Revere and Winthrop	42,142 46		
		$133,749 85	
Personal services:			
Labor of employees		–	
Reimbursement from Board of Retirement		$128 00	
Sales:			
Travel, transportation and office expenses	$9 06		
Food	389 76		
Clothing and materials	–		
Furniture and household supplies	2 00		
Medical and general care	281 54		
Heat, light and power	6,907 81		
Farm	503 93		
Garage, stable and grounds	68 76		
Repairs, ordinary	42 37		
Total sales		$8,205 23	
Miscellaneous:			
Interest on bank balances	$3 79		
Rents	132 06		
Total, miscellaneous		$135 85	
Total earnings for the year			$142,218 93
Total cash receipts reverting and transferred to the State Treasurer			$153,662 64
Accounts receivable outstanding Dec. 1, 1934, adjusted		$85,196 29	
Accounts receivable outstanding Nov. 30, 1935		73,752 58	
Accounts receivable increased			$11,443 71

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$10,696 46
Deficiency Item, 1932		467 00
Appropriation, current year	$331,910 00	331,910 00
Total		$343,073 46
Expenditures as follows:		
Personal services	$180,892 92	
Food	51,112 57	
Medical and general care	20,585 87	
Farm	15,961 48	
Heat, light and power	29,211 67	
Garage, stable and grounds	2,690 43	
Travel, transportation and office expenses	3,677 03	
Religious instruction	1,900 00	
Clothing and materials	194 90	
Furnishings and household supplies	8,590 81	
Repairs, ordinary	5,468 03	
Repairs and renewals	7,158 97	
Total maintenance expenditures		$327,444 68
Balance of maintenance appropriation, Nov. 30, 1935		$15,628 78
Estimated outstanding liabilities, Nov. 30, 1935		$11,099 15

SPECIAL APPROPRIATIONS

Balance December 1, 1935, brought forward		$81,272 78
Appropriations for current year		15,900 00
Total		$97,172 78
Expended during the year (see statement below)	$81,722 21	
Reverting to Treasury of Commonwealth	* 874 08	
(Star balances below that are reverting)		82,596 29
Balance November 30, 1935, carried to next year		$14,576 49

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Sprinklers	1934 Chap. 162	$3,600	$3,420 82	$3,426 37	$173 63
Sewer Connections	1934 Chap. 162	60,790	60,000 00	60,000 00	790 00*
Emergency Public Works-Commission Construction Mass. State Projects-Docket 1354-H-2 Reconstruction, Sewer Lines	–	7,500	946 10	7,417 22	82 78*
Docket 2275-H-3 New Boilers	1935	37,000	12,795 04	33,935 59	3,064 41
Reconstruction Road	Chap. 249	12,000	147 00	147 00	11,338 45
Improvement Water Supply Mains	Chap. 249	3,900	3,898 70	3,898 70	1 30*
	–	124,790	81,722 21	109,339 43	14,576 49

PER CAPITA

During the year the average number of patients has been		$359 52
Total cost of maintenance	$327,444 68	
Equal to a weekly per capita cost of (52 weeks to year)	17 50	
Total receipts for the year	153,662 64	
Equal to a weekly per capita of	8 21	
Total net cost of maintenance for year (total maintenance less total receipts)		173,782 04
Net weekly per capita	9 29	

Respectfully submitted,

MARY A. BOYLE, *Treasurer.*

Inventory, Rutland State Sanatorium

GRAND SUMMARY SHEET

November 30, 1935

REAL ESTATE

Land, 364.727 acres	$15,176 00	
Buildings	664,968 24	
Betterments (additions and improvements)	177,923 46	
Total, Real Estate		$858,067 70

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$781 76	
Food	3,839 86	
Clothing and materials	938 75	
Furnishings and household supplies	1,617 07	
Medical and general care	4,210 18	
Heat, light and power	1,063 85	
Farm	4,611 29	
Garage, stable and grounds	144 34	
Repairs	4,853 61	
		$22,060 71

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$1,612 05	
Clothing and materials	352 39	
Furnishings and household supplies	36,153 63	
Medical and general care	17,834 71	
Heat, light and power	–	
Farm	39,710 27	
Garage, stable and grounds	1,375 57	
Repairs	1,712 21	
Total		$98,750 83

GRAND SUMMARY

Real Estate—Total	$858,067 70	
Personal Property—Undistributed Supplies, Total	22,060 71	
Personal Property—Distributed Supplies, Total	98,750 83	
		$978,879 24

WESTFIELD STATE SANATORIUM

RESIDENT OFFICERS

ROY MORGAN, M.D., *Superintendent.*
HEMAN B. CHASE, M.D., *Assistant Superintendent.*
ELIOT H. LUTHER, M.D., *Senior Physician.*
CHARLES E. GILL, M.D., *Senior Physician.*
HOWARD W. NEWELL, M.D., *Assistant Physician.*
H. VICTOR ASCOLILLO, M.D., *Assistant Physician.*
GEORGE E. CROWELL, D.M.D., *Dentist.*
BESSIE MACDONALD, R.N., *Superintendent of Nurses and Matron.*
JOSEPHINE E. FRENCH, *Treasurer.*
JOHN E. KINSELLA, *Steward.*
BENJAMIN J. SANDIFORD, *Chief Engineer.*
WILLIAM G. ATKINSON, *Head Farmer.*

NON-RESIDENT OFFICERS

*MARSHALL M. MENZIES, M.D., *Consultant in Diseases of Eyes, Ears, Nose and Throat.*
*JOHN PALLO, M.D., *Consultant in Diseases of Eyes, Ears, Nose and Throat.*
A. D. ROOD, M.D., *Consultant in Bronchoscopy.*

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* Six months each.

Report of the Superintendent

To DR. HENRY D. CHADWICK, *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-sixth annual report of the Westfield State Sanatorium for the year ending November 30, 1935.

FINANCIAL STATEMENT

During the year there has been expended $255,006.71 for maintenance, a gross weekly per capita cost of $23.24. There has been expended from Special Appropriations—Improving Water Supply, $1,472.87; Additional Fire Protection, $865.76; P.W.A. Docket No. 1354-Mass. State Project-H-4, $7,803.52, and from P.W.A. Docket No. 1155-Mass. Project-H-102—Cancer and Tuberculosis Hospital, $387.70.

There has been collected from miscellaneous sources (the total of all collections) $61,345.34. Deducting this amount from the gross maintenance expense leaves a net expense of $193,661.97; a net weekly per capita cost of $5.59. There has been collected from private sources $2,340 and from cities and towns $55,755.

Of the 124 patients admitted during the year, 3 cases were supported wholly or in part from private funds; 69 cases by cities and towns; 29 wholly by the State, and 6 by the Department of Public Welfare, Division of Child Guardianship. There were 17 cases on which settlements have not been determined.

POPULATION

There were 218 patients in the sanatorium at the beginning of the year and 210 at the close. The largest number of patients at any one time was 221 and the smallest number was 189. The daily average number of patients was 211. There were 124 patients admitted during the year and 132 were discharged, including deaths. Sixty-four cases were admitted from cities and towns of over 25,000 population and 60 from cities and towns of less than 25,000. The average age of patients was 11.6 years. The average length of stay of patients discharged, including deaths, was 612.8 days. Of the 132 discharged cases, 12 were apparently well, 80 apparently arrested, 21 improved, 9 unimproved, 2 quiescent and 8 deaths. Of the discharged patients, 119 gained 2,142 pounds. Hospital days of patients was 76,996. The average number of employees and officers during the year was 150.

MEDICAL REPORT

Our medical treatment has changed very little. Since we realize more than ever the seriousness of Adult Type Tuberculosis in adolescents, we have been using collapse therapy more than ever. Artificial pneumothorax has been used in 40 cases, 1,017 injections being given. In addition to our own patients, we have continued artificial pneumothorax treatment on 18 cases discharged from Rutland, 1 from Saranac, 1 from Waltham and 1 from Fort Stanton, New Mexico, giving them 314 injections.

Of the discharged patients during the year, 28 had Adult-Type Pulmonary Tuberculosis. Thirteen of these received collapse therapy during their residencies; 10 received pneumothorax alone; 1 phrenic done alone; 1 received pneumothorax and had a pneumolysis and 1 received pneumothorax and had a phrenic and thoracoplasty done.

So far as contagious diseases are concerned, we have been very fortunate. During the year we had only 41 cases of German measles and 2 of chicken pox.

Monthly Consultation Clinics have been held in Great Barrington, Greenfield and North Adams.

Our out-patient work has been continued with no change except that we now require the written request of the family physician or of a legitimate organization before the patient is examined. As usual the number of out-patients has increased.

Figures for the above activities are given in the following table:

	NEGATIVE		SUSPICIOUS		POSITIVE		TOTAL
	New	Re-exam.	New	Re-exam.	New	Re-exam.	
Consultation . .	295	104	25	5	31	81	541
Out-Patient . .	1,422	329	216	119	133	311	2,530

We have continued our cooperation with the Hampden County Tuberculosis Association. Outside of the regular school clinics, we have furnished them medical service for 3 adult clinics in which 115 patients were examined and X-rayed. We have also furnished medical service for the Summer Camp. All the camp children were tested; all the reactors were X-rayed and physical examination made whenever indicated.

Our regular School Clinics have been continued in Berkshire, Franklin and Hampden counties. Last June marked the completion of the first school year of this work. A detailed report of this work was submitted at that time. Fifty-eight cities and towns were covered. Total enrollment in these schools (in the 7th, 9th and 11th grades) was 27,199. Pupils tested numbered 13,421 or 49 per cent. The percentage of reactors was 17. Two thousand four hundred and eighty-two were X-rayed and 276 physical examinations were made. The findings were adult type tuberculosis, 3; adult type observation, 8; childhood type, 38 and childhood type observation, 107.

In addition to the above work, we have conducted X-ray surveys as follows: State College, Amherst, 443 films, and State Teachers College, Westfield, 90 films.

INSTITUTION ACTIVITIES

Eighteen talks on Childhood Tuberculosis were given before various Parent-Teacher Associations in Springfield and vicinity during the year. A lecture on Childhood and Adolescent Tuberculosis was given to a class from Harvard School of Public Health on January 17. On October 15 the institution was visited by the Mother's Club of the South Church, Springfield. They were given an informal talk on Childhood Tuberculosis. On January 26 and January 27 an informal conference on Childhood Tuberculosis was held. This was attended by Doctors Russell, Opie and others of the Rockefeller Foundation, by Doctors Smyllie and Lord of Boston and by Doctors Chadwick, Pope and others of our Department. On May 27 we held our usual conference with health officials and others of Western Massachusetts. These conferences have been held annually for several years under the direction of Dr. Anderson. They have apparently aroused considerable interest and attendance has increased each year. This last conference was attended by 185 visitors.

PERSONNEL CHANGES

Dr. Bernard Goldblatt resigned on April 13, 1935, after a service of five years. His place was taken by Dr. H. Victor Ascolillo of Boston. Miss Avis Waterbury, our efficient Superintendent of Schools for many years reached the retirement age and left the service on December 31, 1934. This vacancy was filled by the promotion of Miss Mary C. O'Brien, who has been on our teaching staff for several years. There were no other important changes in our staff during the year.

IMPROVEMENTS AND CHANGES

An addition to the Staff Dining Room was built during the year at a cost of about $1,500. A porch was added to the Children's Ward. A barn for young stock was built costing about $1,800. Additional sprinklers were installed in some of the buildings. Our water supply has been improved by the addition of a new pump and a considerable amount of new water mains.

Under P.W.A. Docket 1155, Massachusetts State Project-H-102, $900,000 has been allotted for the building and equipment of a new hospital and accessory buildings for the treatment of tuberculosis and cancer. This addition is to provide 150 beds for tuberculosis and 50 beds for cancer. The plans for this work have been completed and bids are to be received early in December of 1935.

RECOMMENDATIONS

Much of our laundry equipment is old and in very poor condition. We have entered a request in our budget for $10,380 to replace a part of this. Our dishwashing machine is badly worn and should be replaced. Under the heading of Water Supply, Fire Protection and Sewerage Disposal, there is considerable work which should be done, much of which has been made imperative by the erection of the new buildings. Estimates for this work have been prepared by the Division of Engineering and have been included in our budget for the coming year.

ACKNOWLEDGMENTS

I wish to thank our clergymen and members of the staff for their continued loyal and efficient support. I am also deeply indebted to you and the other members of the Department for your counsel and support.

SURGICAL REPORT

The following operations have been performed at the sanatorium: tonsillectomy and adenectomy, 18; artificial pneumothorax treatment, 1,331; phrenics, 6 and pneumolysis, 1.

The following was done at the Noble Hospital in Westfield, appendectomy, 1.

LABORATORY REPORT

Urine examinations, 727; sputum examinations, 283; blood counts, 150; animal inoculations, 29; bleeding and clotting time, 15; gastric washings, 23 and miscellaneous, 10.

DENTAL REPORT

The following table shows the work done in the dental clinic during the year: Prophylactic treatments, 381; fillings—permanent teeth, 957; fillings—temporary teeth, 631; extractions—permanent teeth, 103; extractions—temporary teeth, 232; treatments, 32; restorations, 8; x-rays, 21; irrigation, 2; dental examinations, 260.

Total number of operations, 2,627.

Examinations, 1,934; new patients, 19.

SCHOOL REPORT

Average daily attendance from December, 1934, to December, 1935:

Grade I	18.92	Grade VI	17.58
Grade II	18.05	Grade VII	9.18
Grade III	16.19	Grade VIII	8.59
Grade IV	14.41	High school grades	11.15
Grade V	19.8	Manual training	5.68
Total average attendance			139.55
Total enrollment			222

Respectfully submitted,

ROY MORGAN, M.D.,
Superintendent.

Statistical Tables

Table 1.—*Admission and Discharges*

	Males	Females	Totals
Patients in sanatorium November 30, 1934	101	117	218
Patients admitted Dec. 1, 1934, to Nov. 30, 1935 (incl.)	63	61	124
Patients discharged Dec. 1, 1934, to Nov. 30, 1935 (incl.)	66	66	132
Deaths (included in number discharged)	3	5	8
Patients remaining in sanatorium November 30, 1935	98	112	210
Daily average number of patients	95.3	115.7	211

Table 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1934	1935	1934	1935	1934	1935
Advanced	3	5	7	5	4.67	4.1
Bronchiectasis	–	–	2	–	1.33	–
Bronchopneumonia	–	–	–	1	–	.8
Cervical adenitis (tuberculous)	–	–	–	1	–	.8
Childhood tuberculosis	102	65	97	60	64.67	48.4
Childhood tuberculosis (abdominal)	–	–	1	–	.66	–
Childhood type (infiltrative)	–	–	5	4	3.33	3.2
Chorea	–	–	–	1	–	.8
Chronic otitis media	–	–	1	–	.66	–
Malnutrition	–	–	12	10	8.00	8.1
Miliary tuberculosis	1	–	1	–	.66	–
Minimal	17	27	6	13	4.00	10.5
Moderately advanced	13	12	7	14	4.67	11.3
No disease	–	–	5	6	3.33	4.8
Non pulmonary	1	1	–	–	–	–
Osteomyelitis	1	–	–	–	–	–
Pleurisy with effusion	–	1	1	6	.67	4.8
Tabes mesenterica	1	–	–	–	–	–
Tuberculosis of left elbow	–	–	1	–	.67	–
Tuberculosis of the spine	–	–	1	–	.67	–
Tuberculous mesenteric glands	–	–	1	–	.67	–
Tuberculous peritoneal glands	–	–	1	–	.67	–
Unclassified	11	13	1	3	.67	2.4
	150	124	150	124	100.00	100.00

Table 3.—*Civil Condition of Patients Admitted*

	Males	Females	Totals
Single	63	58	121
Married	–	2	2
Divorced	–	1	1
	63	61	124

Table 4.—*Ages of Patients Admitted*

	Males	Females	Totals	Percentages
Under 5 years	9	4	13	10.5
5 to 9 years	18	17	35	28.2
10 to 14 years	16	23	39	31.5
15 to 19 years	18	11	29	23.4
20 years and over	2	6	8	6.4
	63	61	124	100.00

Average age 11.6

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts	55	26	23	52	22	24	107	48	47
Other New England States	5	4	7	3	1	4	8	5	11
Other States	0	2	0	2	9	6	2	11	6
Total Native	60	32	30	57	32	34	117	64	64
Foreign Countries:									
Armenia	0	0	0	1	1	1	1	1	1
Austria	0	2	2	0	0	0	0	2	2
Belgium	0	1	0	0	1	0	0	2	0
Canada	1	13	15	2	11	9	3	24	24
Cape Verde Island	0	1	0	0	0	0	0	1	0
Denmark	0	1	1	0	1	1	0	2	2
Germany	0	1	2	0	1	0	0	2	2
Greece	0	0	0	0	1	0	0	1	0
Ireland	0	1	3	0	1	2	0	2	5
Italy	1	5	5	0	2	2	1	7	7
Lithuania	0	1	1	0	2	2	0	3	3
Newfoundland	0	0	0	1	1	2	1	1	2
Poland	0	3	3	0	2	2	0	5	5
Portugal	1	1	1	0	2	2	1	3	3
Russia	0	0	0	0	1	1	0	1	1
Scotland	0	1	0	0	0	0	0	1	0
Sweden	0	0	0	0	2	2	0	2	2
Total, Foreign Countries	3	31	33	4	29	26	7	60	59
Unknown	0	0	0	0	0	1	0	0	1
Total	3	31	33	4	29	27	7	60	60
Total Native	60	32	30	57	32	34	117	64	64
Grand Total	63	63	63	61	61	61	124	124	124

TABLE 6.—*Residence of Patients Admitted*

Adams	1	Fitchburg	21	Newton	1	Tyngsborough	1
Ashburnham	1	Framingham	2	Northampton	2	Ware	1
Athol	10	Hatfield	1	North Brookfield	1	Webster	1
Belchertown	2	Holden	1	Norwood	1	Wendell	1
Blackstone	1	Holyoke	7	Oxford	1	Westfield	4
Boston	6	Hopedale	1	Palmer	2	West Springfield	3
Brockton	2	Lawrence	1	Pittsfield	5	Weymouth	2
Cambridge	2	Ludlow	1	Sherborn	1	Wilbraham	1
Chelsea	2	Marlborough	2	Southbridge	2	Winthrop	3
Chicopee	3	Milford	3	Southwick	1	Worcester	1
Easthampton	1	Millbury	1	Springfield	13		
Falmouth	1	Needham	1	Stoughton	2	Total	124

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Advanced	1	4	5	4.1
Bronchopneumonia	0	1	1	.8
Cervical adenitis (tuberculous)	1	0	1	.8
Childhood tuberculosis	33	31	64	51.6
Chorea	0	1	1	.8
Malnutrition	5	5	10	8.1
Minimal	6	7	13	10.5
Moderately advanced	5	9	14	11.3
No disease	5	1	6	4.8
Pleurisy with effusion	5	1	6	4.8
Unclassified	2	1	3	2.4
	63	61	124	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested	39	41	80	60.6
Apparently well	7	5	12	9.1
Died	3	5	8	6.1
Improved	10	11	21	15.9
Unimproved	6	3	9	6.8
Quiescent	1	1	2	1.5
	66	66	132	100.00

TABLE 9.—*Deaths, by Length of Residence, at Sanatorium*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
3 to 5 months	0	0	0	1	1	2
8 to 10 months	1	0	1	0	0	0
12 to 18 months	1	0	1	2	0	2
18 to 24 month	1	0	1	0	0	0
Over 2 years	0	5	5	0	4	4
	3	5	8	3	5	8

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis	2	5	7
Tuberculous meningitis	1	0	1
Total	3	5	8

Financial Report, Westfield State Sanatorium, 1935

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1935:

STATEMENT OF EARNINGS

Board of patients:			
Private	$2,340 00		
Cities and towns	55,755 00		
		$58,095 00	
Personal services:			
Reimbursement from Board of Retirement		$91 00	
Sales:			
Food	$220 02		
Clothing and materials	514 13		
Medical and general care	86 97		
Heat, light and power	29 00		
Farm	705 42		
Arts and crafts sale	219 97		
Total sales		$1,775 51	
Miscellaneous:			
Patronage dividend	$4 33		
Total miscellaneous		$4 33	
Total earnings for the year			$59,965 84
Total cash receipts reverting and transferred to the State Treasurer			61,345 34
Accounts receivable outstanding Dec. 1, 1934		$18,212 50	
Accounts receivable outstanding Nov. 30, 1935		16,833 00	
Accounts receivable decreased			$1,379 50

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$6,628 73
Appropriation, current year	$255,190 00	
Supplementary budget	5,700 00	
Salary increases, June 1st	2,955 00	
Salary adjustment—48-hour law	2,160 00	
		266,005 00
Total		$272,633 73
Expenditures as follows:		
Personal services	$158,317 55	
Food	30,321 19	
Medical and general care	9,739 21	
Farm	11,387 14	
Heat, light and power	18,179 58	
Garage, stable and grounds	2,888 26	
Travel, transportation and office expenses	4,058 71	
Religious instruction	1,120 00	
Clothing and materials	2,630 26	
Furnishings and household supplies	6,621 15	
Repairs ordinary	4,709 00	
Repairs and renewals	5,034 66	
Total maintenance expenditures		$255,006 71
Balance of maintenance appropriation, Nov. 30, 1935		17,627 02
Estimated outstanding liabilities, Nov. 30, 1935		$4,866 62

SPECIAL APPROPRIATIONS

Balance December 1, 1934, brought forward		$1,232 43
Appropriations for current year		902,900 00
Total		$904,132 43
Expended during the year (see statement below)	$3,762 28	
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*	$3,762 28
Balance November 30, 1935, carried to next year		$900,370 15

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
P.W.A. Docket 1354 Mass. State Project H-4—Four Sewage Filter Beds	1934	$8,000 00	$1,035 95	$7,803 52	$196 48
Chap. 249 Item 605 Imp. Water Supp. Sys.	1935	1,500 00	1,472 87	1,472 87	27 13
Chap. 249 Item 606 Add. Fire Protection and Sprinklers	1935	1,400 00	865 76	865 76	534 23
P.W.A. Docket 1155 Mass. Project H-102 Cancer and T.B. Group	1935	900,000 00	387 70	387 70	899,612 30
		$910,900 00	$3,762 28	$10,529 85	$900,370 15

PER CAPITA

During the year the average number of patients has been		211
Total cost of maintenance	$255,006 71	
Equal to a weekly per capita cost of (52 weeks to year)	23 24	
Total receipts for the year	61,345 34	
Equal to a weekly per capita of	5 59	
Total net cost of maintenance for year (total maintenance less total receipts)		$193,661 37
Net weekly per capita	17 65	

Respectfully submitted,

JOSEPHINE E. FRENCH,
Treasurer.

Inventory, Westfield State Sanatorium

GRAND SUMMARY SHEET

November 30, 1935

REAL ESTATE

Land, 263.6 acres	$11,021 00	
Buildings	449,071 92	
Betterments (additions and improvements)	8,409 24	
Total, Real Estate		$468,502 16

PERSONAL PROPERTY—UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$200 00	
Food	3,285 33	
Clothing and materials	3,479 91	
Furnishings and household supplies	2,389 29	
Medical and general care	1,271 25	
Heat, light and power	2,766 15	
Farm	2,322 99	
Garage, stable and grounds	87 38	
Repairs	31 33	
		$15,833 63

PERSONAL PROPERTY—DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$3,868 51	
Clothing and materials	977 78	
Furnishings and household supplies	40,966 50	
Medical and general care	43,290 48	
Heat, light and power	3,948 10	
Farm	30,337 73	
Garage, stable and grounds	8,008 02	
Repairs	2,583 02	
Total		$133,980 14

GRAND SUMMARY

Real Estate—Total	$468,502 16	
Personal Property—Undistributed Supplies, Total	15,833 63	
Personal Property—Distributed Supplies, Total	133,980 14	
		$618,315 93

PONDVILLE HOSPITAL

RESIDENT OFFICERS

GEORGE L. PARKER, M.D., *Superintendent.*
RAYMOND E. MILITZER, M.D., *Assistant Superintendent.*
WILLIAM H. ROPER, M.D., *Assistant Physician.*
JESSE S. PARKER, M.D., *Assistant Physician.*
PAUL R. HINCHEY, M.D., *Assistant Physician.*
DAVID T. MONAHAN, M.D., *Assistant Physician.*
CHARLES S. WHELAN, M.D., *Assistant Physician.*
ROBERT FIENBERG, M.D., *Pathologist.*
DALE R. COMAN, M.D., *Pathologist.*
DOROTHY Z. SILVER, R.N., *Principal of School of Nursing.*
MARION MACKENZIE, *Treasurer.*
ELEANOR D. UPHAM, *Dietitian.*
FLORENCE MULLEN, *Head Housekeeper.*
NEIL FOUNTAIN, *Head Social Service Worker.*
ERNEST L. GAGE, *Chief Power Plant Engineer.*
JOHN LANG, *Carpenter.*
JESSE A. SAMPLES, *Groundskeeper.*
NIEL NELSON, *Head of Garage.*

NON-RESIDENT OFFICERS

ERNEST M. DALAND, M.D., *Surgeon and Chief.*
GRANTLEY W. TAYLOR, M.D., *Surgeon.*
HORATIO ROGERS, M.D., *Surgeon.*
RICHARD H. WALLACE, M.D., *Assistant Surgeon.*
VALMORE A. PELLETIER, M.D., *Assistant Surgeon, OPD.*
JOE VINCENT MEIGS, M.D., *Gynecologist.*
LANGDON PARSONS, M.D., *Assistant Gynecologist.*
ROGER C. GRAVES, M.D., *Urologist.*
CHARLES J. E. KICKHAM, M.D., *Asssitant Urologist.*
JOHN S. HODGSON, M.D., *Neurological Surgeon.*
RICHARD H. NORTON, D.M.D., *Oral Surgeon.*
CARL ERNLUND, M.D., *Laryngologist.*
HENRY JACKSON, JR., M.D., *Physician.*
DUDLEY MERRILL, M.D., *Assistant Physician.*
MAXWELL FINLAND, M.D., *Assistant Physician.*
ARTHUR W. GREENWOOD, M.D., *Dermatologist.*
HUGO B. C. RIEMER, M.D., *Opthalmologist.*
RICHARD DRESSER, M.D., *Roentgenologist.*
CHARLES A. DUMAS, M.D., *Assistant Roentgenologist.*
HARRY W. HARDING, D.M.D., *Dentist.*
JAMES C. HUDSON, PH.D., *Physicist.*
SHIELDS WARREN, M.D., *Pathologist.*
F. H. L. TAYLOR, PH.D., *Physiological Chemist.*

Report of the Superintendent

To HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the ninth annual report of the Pondville Hospital (Norfolk), P. O. Wrentham, Massachusetts, for the year ending November 30, 1935.

FINANCIAL STATEMENT

During the year, there has been expended for maintenance $271,205.64, a gross weekly per capita cost of $48.70. There has been collected from miscellaneous sources $92,545.33 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of $178,660.31. The net weekly per capita cost was $32.08. There has been collected from private patients $22,423.00, from cities and towns $45,597.00, from Out-patient Department $1,047.00, from miscellaneous sales and other sources $391.65, and reimbursement from the State Board of Retirement $69.00.

Four hundred and eighty-five patients were supported by private funds, 473 by cities and towns, and 89 by the State, leaving 22 settlements pending.

There has been expended from Special Appropriations allotted under the Acts of 1935, $1,567.03 for the Installation of Incinerator, $70.50 for Engine and Generator Reconditioning and Installing, $1,394.22 for Additional Water Supply and Sprinklers, $565.93 for Generation of Power Improvements. There has been expended from P.W.A. Funds for an addition to present hospital building including furnishings and equipment, P.W.A. Docket 4200, Massachusetts State Project H-6, $55,942.62 and for New Service Building including furnishings and equipment, P.W.A. Docket 4476, Massachusetts State Project H-5, $129,479.85.

Population

There were 96 patients in the hospital on November 30, 1934. During the year, there were 1,186 admissions. Of these, 387 represented readmissions. Patients were received from 165 towns and cities. Patients were also received from 10 other state institutions. One hundred and ten patients remained in the hospital at the end of the year.

Discharges during the year numbered 1,172. The condition of 244 was the same, 718 improved and 210 died. There were 131 autopsies.

The average period of hospitalization was 34 days. The smallest number in the hospital on any one day was 84; the largest number, 120. The average number of patients per day was 107.1.

The daily average number of officers and employees was 144.86.

Medical Report

During the early part of the year, an epidemic of hemolytic streptococcus infection occurred among our patients and employees. Five patients—three post-operative and two non-operative—developed erysipelas. Four of these patients died and one recovered. Several employees developed throat infections necessitating hospitalization. Tonsillectomies and adenoidectomies were done on four employees, and all others having positive cultures for hemolytic streptococcus were isolated until negative cultures were obtained. All admissions and operative work, except emergencies, were discontinued during the epidemic. A "Report on Inspection at Pondville Hospital" was made by Dr. Alton S. Pope, Director, Division of Tuberculosis, and Dr. Elliott S. Robinson, Division of Biologic Laboratories, Department of Public Health.

Irrespective of this epidemic, our number of operations increased 1.1 per cent, although the number of surgical specimens handled by the pathological department decreased 7.7 per cent. Autopsies have decreased 24.3 per cent, while the number of deaths has decreased 25.8 per cent. Admissions have decreased 2.9 per cent and discharges have decreased 4.6 per cent. The average length of hospitalization was 34 days, and, in spite of our rapid turnover since the epidemic, there has been no reduction in our waiting list.

The weekly clinics at the hospital were continued during the year with 49 clinics held. Visits to the regular Thursday clinic numbered 2,876, with an average attendance of 59. Patients making their first visit to the clinic numbered 899. Out-patient visits, other than the regular Thursday clinic, numbered 1,762. Of these, 91 were new patients. The total clinic visits were 4,638. There were 371 clinic patients who subsequently were admitted to the hospital.

A list of medical and surgical articles written by members of the Staff will be found on page 22.

X-ray and Radium:

Diagnostic x-ray plates taken, 4,107; fluoroscopic examinations, 560; x-ray treatments given, 3,503; radium treatments given, 405.

SURGICAL REPORT

Operations: Major, 392; minor, 616; biopsies, 413; esophagoscopies, 13; laryngoscopies, 6; cystoscopies, 252; proctoscopies, 101; bronchoscopies, 5.

An anesthetic was given 1,064 times.

LABORATORY REPORT

Surgical specimens, 1,055; frozen sections, 238; laboratory tests, 17,742.

DENTAL REPORT

Prophylactic treatments, 120; extractions (permanent teeth), 655; treatments, 252; x-ray examinations, 183; examinations, 703. Total, 1,913. Total number of visits, 1,182; total number of new patients, 700.

INSTITUTION ACTIVITIES

In addition to the regular monthly staff meetings, the following programs consisting of clinics and meetings were held at the hospital:

January 8—Andover-Newton Theological Students.

April 14—Meeting of the Committee on Drug Addiction of the National Research Council, at which time Dr. C. K. Himmelsbach, Assistant Surgeon of the U. S. Public Health Service, discussed with the Council the use of morphine derivatives in the treatment of cancer patients and drug addicts.

May 8—Meeting of the Massachusetts Pathological Society.

July 29—Group of students from the class in Social Pathology from Harvard.

November 26—Andover-Newton Theological Students.

In addition, weekly lectures were given by members of the visiting staff to the resident staff.

As usual, good fellowship among the employees has been stimulated by the activities of our local baseball team, tennis, motion pictures and dances. Through the courtesy of the superintendent of the Wrentham State School, our employees have continued to use the bowling alleys of that institution weekly.

PERSONNEL CHANGES

The following additions and changes were made during the year: Dr. Robert Fienberg was appointed resident pathologist to succeed Dr. Cecil Krakower. Dr. Dale R. Coman was appointed resident pathologist. Dr. Paul R. Hinchey and Dr. David T. Monahan were appointed to succeed Dr. Matthew J. Bachulus and Dr. Ira T. Nathanson. Dr. Fred J. C. Smith was appointed to succeed Dr. Claude Welch, and Dr. Charles S. Whelan was appointed to succeed Dr. Fred J. C. Smith. Dr. C. K. Himmelsbach, of the U. S. Public Health Service, completed five months of research work at this institution in May. Miss Grace Early was appointed junior clerk and stenographer to fill the additional position in the record office. Miss Ethel Neary was appointed junior clerk and stenographer to succeed Miss Elsie Goss, resigned. Mr. Raymond Beaudet was appointed hospital usher. Mr. Daniel Donovan was appointed day watchman and Mr. Jesse Samples was appointed groundskeeper. Mr. Niel Nelson was appointed head of the garage. The new 48-hour law added the following employees to our official family: One head nurse, three graduate nurses, seven attendant nurses, one hospital usher, one motor truck driver, one cook, two kitchen helpers and one watchman.

IMPROVEMENTS AND CHANGES

Following are the improvements and changes made during the year:

The "white house" was renovated and a new oil heating apparatus installed, permitting fair accommodations for additional employees under the 48-hour law. The fire hazard of this building has not been eliminated.

The new service building and hospital addition is nearing completion. These two buildings will be ready for occupancy early next year and will add greatly to the efficiency of the dietary, surgical, and out-patient departments. The hospital addition will accommodate twenty-six patients, thus reducing our large waiting list.

Three employees' cottages were furnished with safety ironing equipment.

A new incinerator has been installed.

In order to prevent obstruction of the surface drainage system, a cement retaining wall in the rear of the new service building has been started and it is expected that this will be completed under W.P.A. funds.

Materials have been purchased for a W.P.A project on the roads leading to the employees' cottages, and it is expected that this project will be completed early next year.

The Division of Sanitary Engineering recommended a survey of the water system and the installation of test wells on the hospital property, all of which has been completed this year. The results are most gratifying and demonstrate an adequate water supply for the future.

The roofs of the superintendent's cottage, Ward B, and the storeroom have been repaired.

The buckled walls of Ward A and the storeroom have been rebuilt.

Miscellaneous plastering wherever urgent has been done throughout the hospital building and employees' cottages.

New plumbing fixtures have been installed and renovations made in the bathroom of the superintendent's cottage.

Recommendations

The housing accommodations for the employees have not expanded with the enlargement of the hospital and the increase in number of employees caused by the passage of the recent 48-hour law. A 100-bed nurses' dormitory would solve the immediate and future housing problem.

No fire protection has been provided for the "white house" because of insufficient funds. If this building is to be used for employees, adequate fire protection is imperative. I, therefore, respectfully request that allowance for such protection be made.

Our present garage accommodates a small number of cars and I recommend that a larger garage be built to provide space for the cars owned by employees which are now scattered about the grounds. A monthly assessment of the employees could be made until the project is self-sustaining.

This year's budget contained insufficient funds to rectify the deplorable condition of our roads, sidewalks, and parking space, and to provide adequate lighting facilities at our road entrance and parking space. I earnestly request that allowance be made to complete this project next year.

As the hospital expands and there is an increase in the number of necropsies, specimens will accumulate so that there will be insufficient room to work properly in our autopsy department. I, therefore, respectfully request an allowance to rectify this situation.

The pharmacy now located on Ward A has outgrown its present quarters. It is requested that it be transferred to the basement and provision made for the necessary equipment, including steel shelves, stands, and holders for large bulk supplies. The present pharmacy could then be used to accommodate two additional ward patients.

This year's budget provided an allowance for the installation of safety ironing equipment in the employees' cottages to prevent fire hazard. The amount was insufficient to complete the installation of this equipment in all the cottages. I hereby request sufficient funds to complete the installation in the remaining cottages.

The plumbing equipment in this institution is in a deplorable condition. Several of the employees' cottages and utility rooms in the hospital wards need new lavatories, new piping, and new fixtures. I strongly recommend a sufficient appropriation to rectify this condition.

No provision was made in the new hospital addition for diet kitchens. The present diet kitchens on Wards C and D which are not adequate for their present demands will be forced to serve these additional wards. Therefore, I respectfully request that allowance be made to enlarge them.

The roofs of some of our buildings have been repaired this year. Several of them were in worse condition than anticipated, making the funds insufficient to complete the work. I respectfully request that funds be allowed to make these repairs.

Some of the floors throughout the hospital buildings and employees' living quarters should be either replaced or covered with linoleum. I hereby recommend that allowance be made for this work.

ACKNOWLEDGMENTS

To the Rev. Father Mitchell, the Rev. Father Hagan, the Rev. Father Fallon, and the Rev. Melville Shafer, who have ministered so faithfully to the spiritual needs of our patients, I am greatly indebted.

I wish to express my appreciation to the members of the Social Service Committee, to the Ladies' Society of the Wrentham Congregational Church, and to the Norfolk Young Women's Society, under the supervision of Miss Conroy, who have, as usual, given so freely of their time and resources in maintaining the happiness of our patients.

To the numerous groups of choir singers and the American Legion Band of Norwood who have rendered musical programs for our patients, I am deeply grateful.

I extend my thanks and appreciation to those loyal and faithful employees who have helped to carry on the work during the year.

To you and to the other members of the Department, I wish to express my appreciation for your assistance throughout the year.

Respectfully submitted,

GEORGE L. PARKER, M.D.,
Superintendent.

Statistical Tables

TABLE 1—*Admissions and Discharges*

	Males	Females	Totals
Patients in hospital December 1, 1934	55	41	96
Patients admitted from December 1, 1934, to November 30, 1935, inclusive	560	626	1,186
Patients discharged from December 1, 1934, to November 30, 1935, inclusive	558	614	1,172
Patients remaining in hospital November 30, 1935	57	53	110
Daily average number of patients	57.7	49.4	107.1
Deaths (included in number discharged)	135	75	210

TABLE 2.—*Readmissions*

	Males	Females	Totals
Total patients treated	615	667	1,282
Less old patients readmitted first time since December 1, 1934	70	104	174
Less other readmissions	111	102	213
Less patients in hospital December 1, 1934	55	41	96
Number new patients admitted from December 1, 1934, to November 30, 1935	379	420	799
Total number different patients treated December 1, 1934, to November 30, 1935	504	565	1,069

TABLE 3—*Civil Condition of New Patients Admitted*

	Males	Females	Totals
Single	81	45	126
Married	198	251	449
Widowed	86	107	193
Divorced	8	9	17
Separated	6	8	14
Totals	379	420	799

TABLE 4—*Age of New Patients Admitted*

	Males	Females	Totals
Under 20 years	11	4	15
20 to 29 years	10	15	25
30 to 39 years	19	51	70
40 to 49 years	40	111	151
50 to 59 years	84	92	176
60 to 69 years	109	85	194
70 to 79 years	88	54	142
80 to 89 years	17	7	24
90 to 99 years	1	1	2
Totals	379	420	799

Table 5—*Nativity of New Patients Admitted*

	Males	Females	Totals
United States	197	272	469
Armenia	4	0	4
Austria	1	0	1
Belgium	2	0	2
Canada	49	55	104
China	1	0	1
Czechoslovakia	0	1	1
England	22	15	37
Finland	2	1	3
France	0	1	1
Germany	6	4	10
Greece	2	1	3
Holland	1	0	1
Ireland	32	21	53
Italy	20	12	32
Latvia	2	1	3
Lithuania	5	3	8
Newfoundland	0	1	1
Poland	7	7	14
Portugal	3	5	8
Rumania	0	1	1
Russia	8	4	12
Scotland	7	8	15
Sweden	6	3	9
Syria	1	3	4
Turkey	1	0	1
Wales	0	1	1
Totals	379	420	799

Table 6—*Residence of New Patients Admitted*

Abington	2	Easton	1	Medford	4	Seekonk	1
Adams	3	Edgartown	2	Medway	5	Sharon	6
Agawam	2	Everett	2	Mendon	1	Sherborn	1
Amesbury	2	Fairhaven	2	Methuen	2	Shrewsbury	2
Amherst	4	Fall River	19	Middleborough	6	Somerset	1
Andover	4	Fitchburg	11	Middleton	1	Somerville	4
Arlington	2	Foxborough	3	Milford	12	Springfield	37
Ashburnham	2	Framingham	8	Millis	2	Stockbridge	2
Athol	7	Franklin	10	Monson	2	Stoughton	6
Attleboro	22	Freetown	1	Montague	3	Sutton	2
Avon	2	Gardner	3	Needham	1	Swampscott	1
Ayer	1	Georgetown	1	New Bedford	19	Swansea	1
Barnstable	4	Gloucester	1	Newburyport	2	Taunton	46
Bellingham	1	Grafton	2	Newton	4	Templeton	2
Belmont	1	Granville	1	Norfolk	1	Tisbury	1
Berkley	1	Greenfield	1	North Adams	8	Townsend	1
Beverly	2	Halifax	1	North Andover	1	Upton	3
Billerica	1	Hanson	2	No. Attleborough	14	Uxbridge	1
Boston	74	Hatfield	1	Northampton	3	Wakefield	2
Bourne	1	Haverhill	2	Northborough	3	Walpole	2
Braintree	3	Holbrook	1	Norton	7	Waltham	2
Bridgewater	1	Holliston	6	Norwell	3	Ware	3
Brockton	33	Holyoke	11	Norwood	10	Wareham	6
Brookline	4	Hopedale	2	Orange	2	Watertown	1
Cambridge	11	Huntington	1	Peabody	1	Webster	2
Carver	1	Lakeville	2	Pembroke	1	Wellesley	1
Chelsea	2	Lancaster	1	Pittsfield	7	Westborough	1
Chicopee	9	Lawrence	14	Plainville	2	West Bridgewater	1
Clinton	1	Leicester	1	Plymouth	5	West Brookfield	2
Colrain	1	Lenox	1	Plympton	1	West Springfield	7
Concord	1	Leominster	6	Provincetown	1	Westfield	6
Dartmouth	1	Lexington	2	Quincy	11	Westwood	1
Dedham	9	Lowell	8	Randolph	1	Weymouth	3
Deerfield	1	Ludlow	1	Raynham	1	Whitman	5
Dennis	2	Lynn	13	Rehoboth	2	Winchendon	2
Dover	1	Malden	2	Revere	2	Winthrop	2
Douglas	1	Mansfield	8	Rockland	5	Worcester	26
Dudley	2	Marion	1	Russell	2	Wrentham	11
Duxbury	2	Marlborough	3	Rutland	1	Yarmouth	1
East Bridgewater	1	Marshfield	1	Salem	3	State Institutions	40
Eastham	1	Maynard	2	Salisbury	1		
Easthampton	1	Medfield	1	Sandwich	2		

Table 7.—*State of Disease of New Patients Admitted*

	Males	Females	Totals
Early	60	58	118
Moderately advanced	156	120	276
Advanced	120	126	246
Non-malignant	43	116	159
	379	420	799

Table 8.—*Condition of Patients Discharged*

	Males	Females	Totals
Same	119	125	244
Improved	304	414	718
Totals	423	539	962

TABLE 9

This table includes all new cases treated, both house patients and out-patients. In some instances, the same patient has been counted twice or more times, according to the varying conditions presented.

	Males	Females	Totals
CARCINOMA			
Buccal cavity and pharynx:			
Buccal cavity	15	3	18
Cheek	5	2	7
Floor of mouth	4	–	4
Jaw	2	–	2
Lip	46	2	48
Palate	3	–	3
Pharynx	3	1	4
Tongue	24	2	26
Tonsil	8	–	8
	110	10	120
Digestive tract and Peritoneum:			
Bile-duct	2	2	4
Colon	4	1	5
Esophagus	14	5	19
Intestine	1	–	1
Rectum	36	16	52
Sigmoid	5	3	8
Stomach	33	12	45
Liver	2	–	2
Pancreas	2	2	4
	99	41	140
Respiratory System:			
Bronchus	4	1	5
Ethmoid	1	–	1
Larynx	24	2	26
Lung	11	2	13
Nasopharynx	2	–	2
	42	5	47
Female Genital Organs:			
Cervix	–	86	86
Ovary	–	13	13
Uterus	–	20	20
Vagina	–	3	3
Vulva	–	8	8
	–	130	130
Breast	2	107	109
Male Genito-Urinary Organs:			
Bladder	14	–	14
Kidney	2	–	2
Penis	4	–	4
Prostate	21	–	21
Scrotum	2	–	2
Testicle	4	–	4
	47	–	47
Skin:			
Ear	7	1	8
Eyelid	4	1	5
Face	46	31	77
Nose	22	16	38
Scalp	1	–	1
Skin (other sites)	22	12	34
Temple	5	4	9
	107	65	172
Other or Unspecified Organs:			
Antrum	2	–	2
Kidney (female)	–	3	3
Lacrimal gland	1	–	1
Neck	1	–	1
Neck (primary site unknown)	5	2	7
Nostril	1	–	1
Parotid	2	–	2
Thyroid	–	2	2
Urethra (female)	–	2	2
Carcinomatosis (primary site unknown)	1	2	3
	13	11	24

	Males	Females	Totals
LYMPHOBLASTOMA AND HODGKIN'S DISEASE	26	11	37
ENDOTHELIOMA (EWING'S TUMOR):			
Femur	1	–	1
ANGIO-ENDOTHELIOMA:			
Ear	1	–	1
LEUKEMIA	2	2	4
MULTIPLE MYELOMA	1	–	1
SARCOMA:			
Ovary	–	1	1
Uterus	–	1	1
Fibrosarcoma:			
Thigh	1	–	1
Abdominal wall	1	–	1
Jaw	1	–	1
Adenofibrosarcoma (breast)	–	2	2
Neurogenic fibrosarcoma:			
Ischio-rectal fossa	–	1	1
Pharynx	1	–	1
Leiomyosarcoma (uterus)	–	1	1
Liposarcoma (bladder)	1	–	1
Osteogenic sarcoma:			
Femur	2	–	2
Ilium	–	1	1
	7	7	14
AMELANOTIC MALIGNANT MELANOMA:			
Ankle	–	1	1
MALIGNANT MELANOMA:			
Cheek	–	1	1
Eye	–	1	1
Leg	–	2	2
Parotid region	–	1	1
	–	5	5
MIXED TUMOR, MALIGNANT (parotid)	1	–	1
ADAMANTINOMA:			
Jaw	2	1	3
MALIGNANT TERATOMA:			
Spermatic cord	1	–	1
NON-MALIGNANT TUMORS:			
Adenocystoma	–	2	2
Adenofibroma	–	7	7
Adenoma	4	3	7
Angioma	–	3	3
Fibroadenoma	–	3	3
Cyst	5	3	8
Cystadenoma	–	4	4
Fibroid (leiomyoma)	1	35	36
Fibroma	1	5	6
Giant-cell tumor (benign)	–	1	1
Hemangioma	4	11	15
Hepatoma	–	1	1
Lipoma	11	12	23
Lymphangioma	1	–	1
Mixed tumor	–	2	2
Neurofibroma	1	1	2
Neuroma	1	–	1
Odontoma	1	–	1
Osteochondroma	1	–	1
Osteoma	1	1	2
Papilloma	11	14	25
Polyp	5	36	41

TABLE 9—*Continued*

	Males	Females	Totals
NON-MALIGNANT TUMORS (Continued):			
Teratoma . .	1	–	1
Xanthoma . .	–	1	1
Tumors, nature unspecified .	2	3	5
	51	148	199
RHEUMATIC AND NUTRITIONAL DISEASES:			
General diseases	5	24	29
Diabetes mellitus	9	19	28
Diseases of thyroid	2	7	9
	16	50	66
DISEASES OF BLOOD AND BLOOD-MAKING ORGANS	4	7	11
DISEASES OF NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE:			
Nervous system .	11	21	32
Organs of vision	2	4	6
	13	25	38
DISEASES OF CIRCULATORY SYSTEM:			
Circulatory system (general) . .	108	101	209
Lymphatic system	2	1	3
	110	102	212
DISEASES OF RESPIRATORY SYSTEM:			
Nasal fossae and annexae . .	1	3	4
Larynx . .	1	–	1
Bronchus . .	6	4	10
Lung . . .	41	21	62
Pleura . . .	4	–	4
	53	28	81
DISEASES OF DIGESTIVE SYSTEM:			
Buccal cavity and annexae, pharynx and tonsils .	49	19	68
Esophagus . .	1	2	3
Ulcer of stomach and duodenum .	33	9	42
Stomach . .	8	4	12
Intestines . .	53	38	91
Liver . . .	4	2	6
Gall-bladder and biliary passages .	9	39	48
Pancreas . .	–	1	1
Peritoneum . .	2	4	6
	159	118	277
DISEASES OF GENITO-URINARY SYSTEM:			
Kidneys and ureters	20	17	37
Bladder . .	5	13	18
Urethra, urinary abscess, etc. .	3	8	11
Prostate . .	30	–	30
Male genital organs	9	–	9
Female genital organs	–	132	132
Cysts of ovary .	–	13	13
Breast . .	–	55	55
	67	238	305
DISEASES OF SKIN AND CELLULAR TISSUE:			
Keloid . . .	1	2	3
Keratosis . .	59	34	93
Sebaceous cyst .	7	4	11
Verruca . .	4	6	10
Other diseases .	15	11	26
	86	57	143
DISEASES OF BONES AND ORGANS OF LOCOMOTION .	6	10	16
CONGENITAL MALFORMATIONS:			
General diseases .	1	2	3
Nevus . . .	5	11	16
	6	13	19
INFECTIOUS AND PARASITIC DISEASES:			
General diseases .	3	15	18
Syphilis . .	23	14	37
Tuberculosis .	11	11	22
	37	40	77
OTHER CONDITIONS .	14	13	27
NO DISEASE . .	6	7	13
NO DIAGNOSIS . .	13	17	30

Financial Report, Pondville Hospital at Norfolk, 1935

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1935:

STATEMENT OF EARNINGS

Board of patients:			
Private	$22,423 00		
Cities and towns	45,597 00		
Out-patient department	1,047 00		
Accident cases	75.50		
		$69,142 50	
Personal services:			
Reimbursement from Board of Retirement		$69 00	
Sales:			
Travel, transportation and office expenses	$7 57		
Food	148 94		
Furniture and household supplies	80		
Medical and general care	44 19		
Heat, light and power	8 62		
Garage, stable and grounds	9 50		
Miscellaneous—junk	35 03		
Board, special nurses	27 00		
Total sales		$281 65	
Miscellaneous:			
Room rent	$70 00		
Board, employee's son	40 00		
Total, miscellaneous		$110 00	
Total earnings for the year			$69,603 15
Total cash receipts reverting and transferred to the State Treasurer			92,545 33
Accounts receivable outstanding Dec. 1, 1934		$79,715 67	
Accounts receivable outstanding Nov. 30, 1935		56,773 49	
Accounts receivable decreased			$2,942 18

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		$3,759 27
Appropriation, current year:		
Radium	$7,500 00	
Other maintenance	271,035 00	
		$278,535 00
Total		$282,294 27
Expenditures as follows:		
Personal services	$153,265 68	
Food	39,123 72	
Medical and general care	20,072 11	
Farm	–	
Heat, light and power	14,469 14	
Garage, stable and grounds	1,875 03	
Travel, transportation and office expenses	9,549 57	
Religious instruction	1,200 00	
Clothing and materials	415 96	
Furnishings and household supplies	15,587 50	
Repairs, ordinary	2,029 75	
Repairs and renewals	5,915 58	
Radium	7,701 60	
Total maintenance expenditures		$271,205 64
Balance of maintenance appropriation, Nov. 30, 1935		$11,088 63
Estimated outstanding liabilities, Nov. 30, 1935		$2,666 95

SPECIAL APPROPRIATIONS

Balance December 1, 1934, brought forward		$219,882 85
Appropriations for current year		69,953 57
Total		$289,836 42
Expended during the year (see statement below)	$189,020 15	
Reverting to Treasury of Commonwealth	* Nothing	
(Star balances below that are reverting)		$189,020 15
Balance November 30, 1935, carried to next year		$100,816 27

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Massachusetts State Project H-6 P.W.A. Docket 4200	1934	$95,425 00	$55,942 62	$76,782 57	$18,642 43
Massachusetts State Project H-5 P.W.A. Docket 4476	1934	221,400 00	129,479 85	173,628 48	47,771 52
Installation of Incinerator	1935	2,000 00	1,567 03	1,567 03	432 97
Moving and Improving Bacteriological Laboratory	1935	2,000 00	–	–	2,000 00
Engine and Generator Reconditioning and Installing	1935	2,500 00	70 50	70 50	2,429 50
Service Building renovating, etc.	1935	10,000 00	–	–	10,000 00
Additional Water Supply and Sprinklers	1935	3,000 00	1,394 22	1,394 22	1,605 78
Generation of Power Improvements	1935	18,500 00	565 93	565 93	17,934 07
Totals	–	$354,825 00	$189,020 15	$254,008 73	$100,816 27

PER CAPITA

During the year the average number of patients has been		107.1
Total cost of maintenance	$271,205 64	
Equal to a weekly per capita cost of (52 weeks to year)	48 70	
Total receipts for the year	92,545 33	
Equal to a weekly per capita of	16.62	
Total net cost of maintenance for year (total maintenance less total receipts)		$178,660 31
Net weekly per capita	32 08	

Respectfully submitted,

MARION MACKENZIE,
Treasurer.

Inventory, Pondville Hospital at Norfolk

GRAND SUMMARY SHEET

November 30, 1935

REAL ESTATE

Land, 324.2 acres	$12,357 00	
Buildings	479,774 03	
Betterments (additions and improvements)	260,198 12	
Total, Real Estate	$752,329 15	
Less 3% depreciation on buildings	22,199 16	
		$730,129 99

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$1,009 33	
Food	3,019 05	
Clothing and materials	1,961 06	
Furnishings and household supplies	6,776 30	
Medical and general care	24,894 83	
Heat, light and power	4,369 65	
Farm	–	
Garage, stable and grounds	100 02	
Repairs	6,451 07	
		$48,581 31

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses	$5,785 36	
Clothing and materials	2,676 99	
Furnishings and household supplies	57,387 34	
Medical and general care	53,222 55	
Heat, light and power	1 20	
Farm	–	
Garage, stable and grounds	7,465 46	
Repairs	4,186 94	
Total	$130,725 84	
Less 5% depreciation	6,536 29	
		$124,189 55

GRAND SUMMARY

Real Estate—Total	$730,129 99	
Personal Property—Undistributed Supplies, Total	48,581 31	
Personal Property—Distributed Supplies, Total	124,189 55	
		$902,900 85
Radium (Salt in Emanation Plant)		69,880 30
		$972,781 15

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